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ALLIED TANKS IN NORMANDY 1944

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ILLUSTRATED BY FELIPE RODRÍGUEZ

NEW VANGUARD 294

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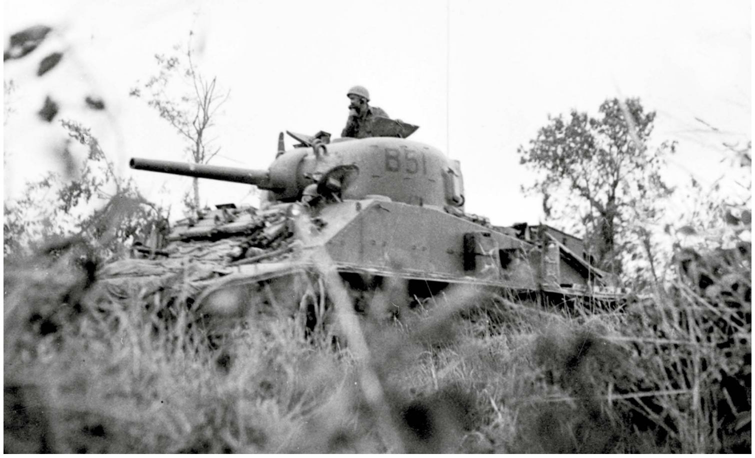
ALLIED TANKS IN NORMANDY 1944

THE CAMPAIGN

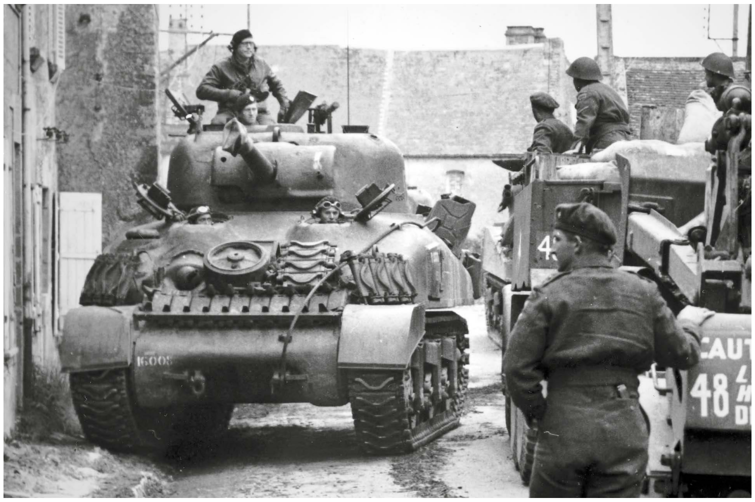
This book surveys the principal tanks used by the Allied armies during the Normandy campaign, as well as tank surrogates such as the tank destroyers and assault guns. Due to space limitations, it does not cover self-propelled (SP) field artillery or light armored vehicles such as armored cars and half-tracks. For convenience sake, the term “AFV” (Armored Fighting Vehicle) in this book refers to the tank surrogates such as assault guns and tank destroyers.

By D-Day+1, July 7, 1944, the Allies had a firm foothold in Normandy on five invasion beaches. The Allied ground units were subordinate to the 21st Army Group, commanded by General Bernard Montgomery. The First US Army (FUSA) under Lt Gen Omar Bradley held the two western beachheads. Further to the east were two British beaches, Gold and Sword, and between them the Canadian beach, Juno. The size of the Allied armored force at this point was modest, consisting mainly of British/Canadian armored regiments and US tank battalions that had landed on D-Day to support the infantry force. There was a steady stream of additional Allied tank units arriving daily as the beachheads expanded southward.



A Sherman V DD tank of the 10th Canadian Armoured Regiment (The Fort Garry Horse) near the Carpiquet airfield on June 8, 1944. The metal elements of the Duplex Drive skirt can still be seen on the tank, though the canvas skirt and inflatable tubes have been removed. (LAC PA-133977)

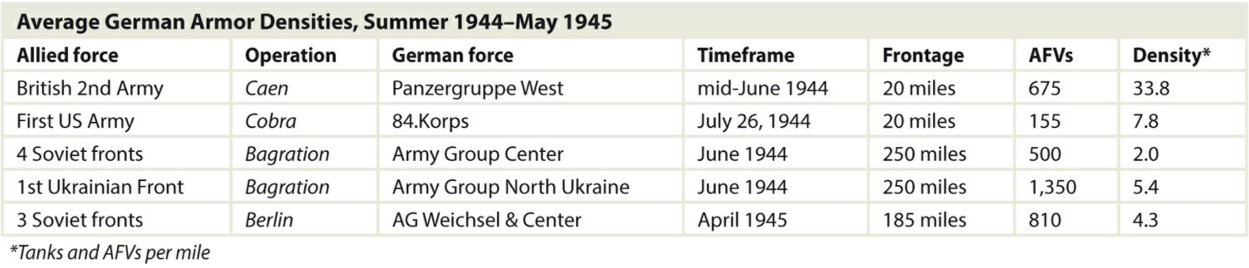
The Allies had two broad sets of operational objectives following the landings. In the British/Canadian sector to the east, the primary objective was the city of Caen, which was envisioned as the pivot point for the advance eastward towards Germany. The *Overlord* plan had optimistically forecast that Caen would be liberated on D-Day, but it took more than a month of hard fighting to finally secure the city. In the American sector, the short-term objective was to pivot westward to cut off the Cotentin peninsula in order to liberate the port of Cherbourg. The *Overlord* plan expected Cherbourg to fall by D+15, but in fact the city was not liberated until June 26 (D+20), and the entire Cotentin peninsula was declared secure on July 1. Once Cherbourg was liberated, the focus shifted to a southward push towards St Lô to reach open ground beyond the difficult coastal hedgerow terrain.



A Sherman II of the 4th Armoured Brigade moving forward from the landing beaches in early June 1944. The 4 Arm Bde was the major user of the Sherman II in the 2nd British Army. This is from a later production batch with the M34A1 gun mount.

In terms of armored forces, the *Overlord* plan put the initial emphasis on the British/Canadian sector. This was dictated both by operational objectives and the terrain. The area around Caen consisted mainly of open farmland that was well suited to large-scale mechanized maneuver. Further west towards the American sector, the terrain gradually shifted to bocage. Bocage was a French term for compartmented farm fields edged in dense hedgerows that had been created over the centuries to shield the land from the harsh coastal weather. This terrain was very well suited to defense, analogous to an upside-down trench system. The bocage terrain north of St Lô was complicated by extensive areas of marsh and wetlands, amplified by deliberate German flooding. The bocage country was ill-suited to armored operations beyond modest numbers of tanks for close infantry support.

German tank strength had been concentrated on the Russian Front until May 1944, when the balance began to shift in favor of the Western Front. German tank deployments in Normandy largely mirrored the Allied dispositions. Panzer forces in the American sector in June were meager, consisting of the 17.SS-Panzergrenadier-Division and a small number of assault gun and tank training units. In the Caen sector, 21.Panzer-Division had been active since D-Day, and there was a steady flow of panzer divisions into this area through June and July. As a result, the British 2nd Army faced an exceptionally dense defensive array by mid-June 1944 around Caen. The accompanying chart here helps to explain why the British forces had such a difficult time advancing beyond Caen in the weeks after D-Day compared to some other well-known campaigns.



Average German Armor Densities, Summer 1944–May 1945

Allied force	Operation	German force	Timeframe	Frontage	AFVs	Density*
British 2nd Army	*Caen*	Panzergruppe West	mid-June 1944	20 miles	675	33.8
First US Army	*Cobra*	84.Korps	July 26, 1944	20 miles	155	7.8
4 Soviet fronts	*Bagration*	Army Group Center	June 1944	250 miles	500	2.0
1st Ukrainian Front	*Bagration*	Army Group North Ukraine	June 1944	250 miles	1,350	5.4
3 Soviet fronts	*Berlin*	AG Weichsel & Center	April 1945	185 miles	810	4.3

**Tanks and AFVs per mile*

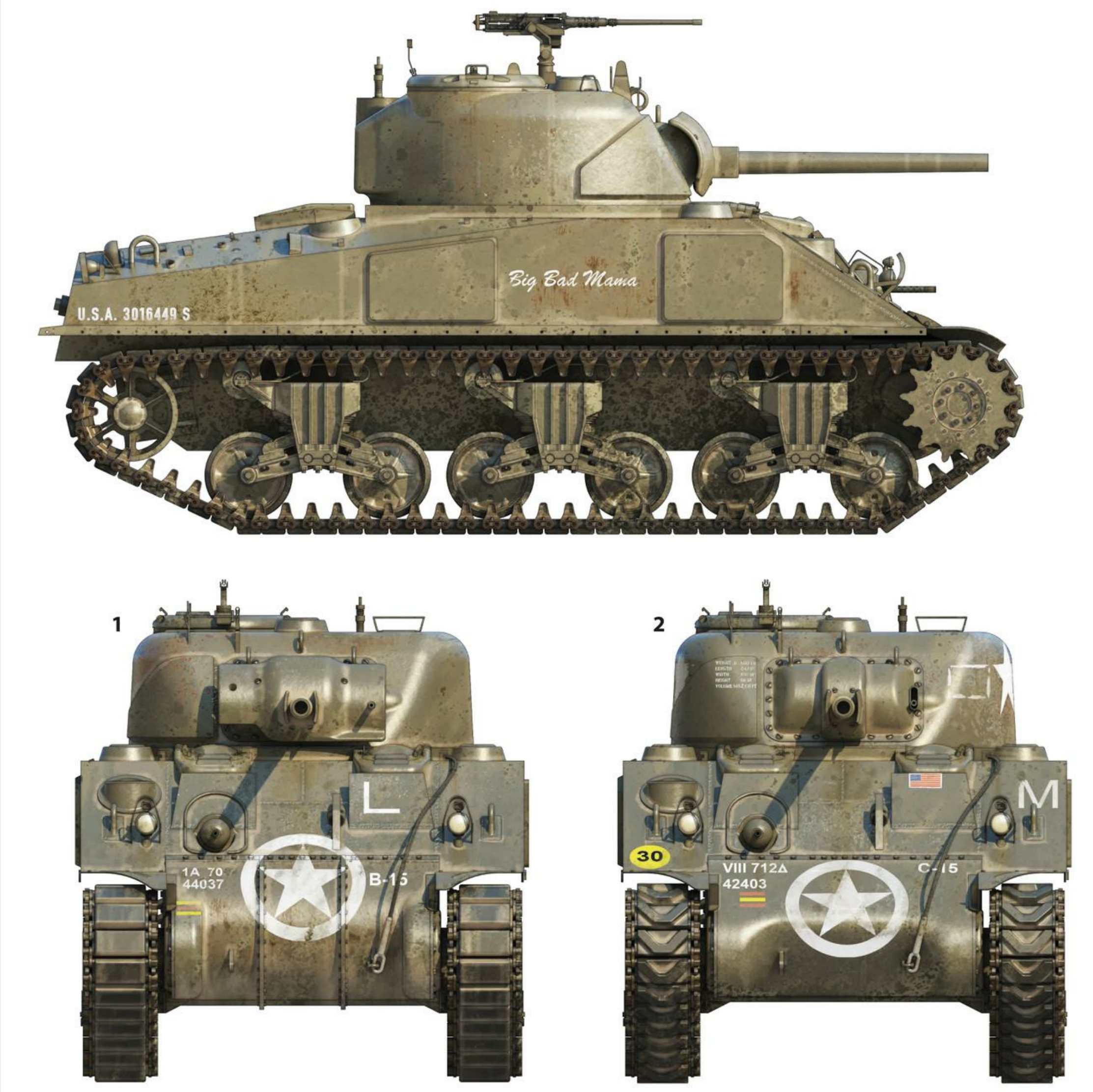
As a result of the terrain conditions, the character of armored warfare in Normandy was considerably different between the British/Canadian and American sectors. There was very little tank-vs-tank fighting in the FUSA sector, which mainly involved infantry operations. Most US Army tank losses were due to antitank guns, mines, and close-combat weapons such as the new Panzerfaust, Panzerschreck, and Puppchen rocket launchers. In contrast, the British and Canadian forces faced massed German panzer formations from the outset of the campaign, as well as an assortment of antitank guns and close-combat antitank weapons.

A Sherman VC of the Staffordshire Yeomanry, 27th Armoured Brigade, on June 13, 1944. This was probably the first unit to use the 17-pdr tanks in combat.

The first large-scale British armored engagement was Operation *Perch*, conducted primarily by the 7th Armoured Division on June 10–14. This was an attempt to outflank the heavy concentration of German panzer forces facing Caen by an envelopment maneuver further west from the Tilly area toward the village of Villers-Bocage. This operation turned into a fiasco when elements of a German Tiger battalion shot up the spearhead of the British advance and rampaged through the lightly armored rear echelons of one of the British brigades around Villers-Bocage. This action sealed the reputation of German tank ace Michael Wittmann and cemented the legend of the invincible Tiger tank.

The British problems in the Caen sector were the result of the density and tactical skills of German tank and anti tank forces, as well as lingering doctrinal problems in the British armored force. The British armored divisions had difficulties adapting from the tank-focused tactics of the North Africa campaign to late-war combined arms tactics.

A BATTLE FOR THE COTENTIN PENINSULA, JUNE 1944



The US Army's VIII Corps was supported by the 6th Armored Group during the Cotentin/Cherbourg campaign. In the latter half of June, the staff assigned each of the four attached battalions with a letter to be painted on the upper left corner of the hull front, presumably to make it easier to identify the units during movement. The letters were: L (746th Tank Battalion), M (712th), N (749th), and O (70th). The tanks at this point had a mishmash of tactical markings, plus various temporary movement markings used for traffic control during amphibious transport from the UK. This included the use of a five-digit unit serial number painted in white on the hull front, along with a corresponding three-bar POM (Preparation for Overseas Movement) code, the top and bottom color bar representing the penultimate number and the middle bar indicating the last digit of the code. The British Army used the same system, but its number/color combination was different.

1. M4 medium tank, B Company, 746th Tank Battalion, Cherbourg, June 1944

B-15 “Big Bad Mama” displayed the usual bumper code, with “1A 70” on the right side of the transmission cover lip indicating First US Army, 70th Tank Battalion, and the company/tank number on the left side. The Allied star is on the hull front per Op Memo 20. The POM marking is yellow/maroon/yellow. The registration number for this tank is not clear in the reference photo, and the one shown is only representative of the size and location on the rear of the hull side.

2. M4 medium tank, 712th Tank Battalion, Cotentin peninsula, June 1944

This tank of the recently arrived 712th Tank Battalion has numerous remnants of the movement markings. Vehicles were issued with a paper US flag to be attached to the left front of the vehicle and seen here on the appliqué armor in front of the driver. On the right side of the turret front is some left over tape that had affixed the tank’s movement instructions, which had since been torn off. The tank shipping data is stenciled on the left side of the turret, though more commonly this was painted on the hull. The unit bumper code is VIII 712^ C-15, indicating VIII Corps, 712th Tank Battalion, C Company, tank 15. A triangle in the bumper code indicated a tank/armored unit. The POM barcode is brown/yellow/brown. On the right lower side is the yellow bridging circle indicating the vehicle’s loaded weight.

A Sherman VC Firefly of the 27th Canadian Armoured Regiment (Sherbrooke Fusiliers), 2nd Armoured Brigade, moving forward near Buron on July 17, 1944. The regiment was heavily involved in combat with elements of the 12.SS-Panzer-Division in this sector in the first days after the D-Day landings. (LAC PA-131391)

A Canadian Sherman V tank advancing through Caen on July 10, 1944 after the city's capture. Although this tank is usually identified as belonging to the Sherbrooke Fusiliers, the arm-of-service marking on the bow suggests it is an Observation Post vehicle of one of the M7 105mm SP field artillery regiments supporting the Canadian 3rd Infantry Division during Operation *Charnwood*. (LAC PA-162667)

The British armored divisions did not regularly integrate armored, infantry, and field artillery formations below regimental level for most missions. For example, when attempting to capture a defended village, a tank regiment had the firepower and maneuver to penetrate and outflank the German defenses, but did not have infantry on hand to quickly seize and occupy the village.

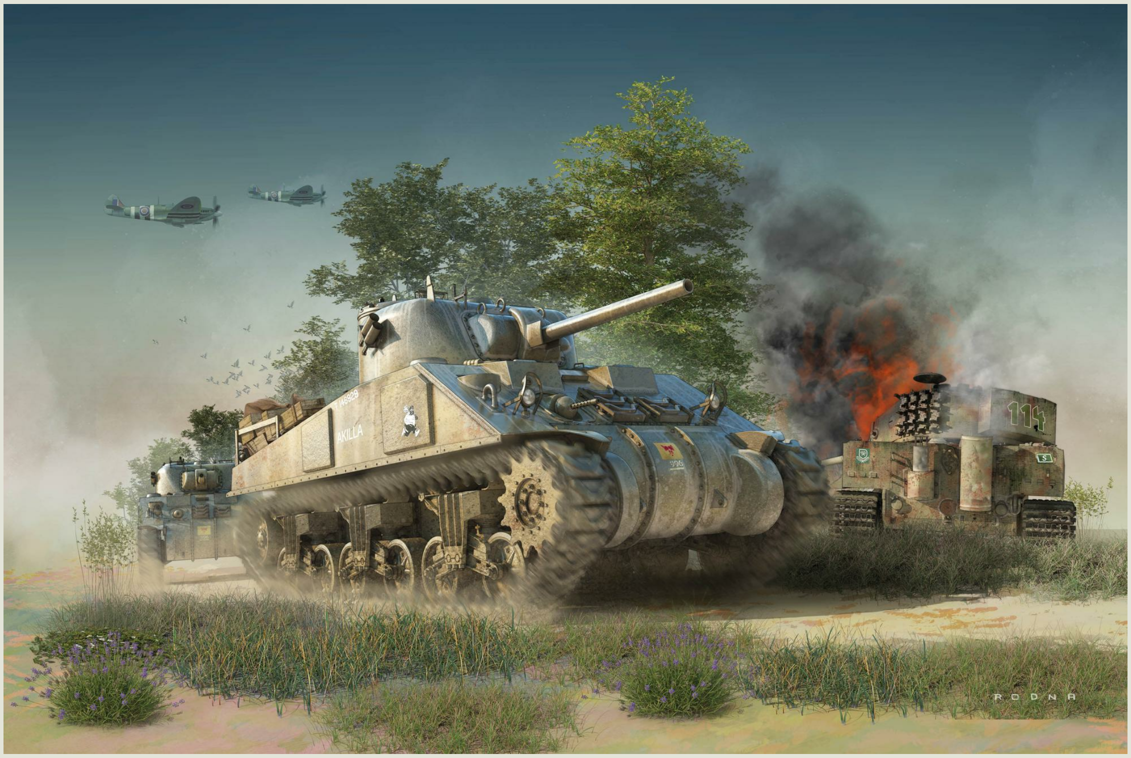
An American M5A1 light tank of the headquarters company of 2/33rd Armored, 3rd Armored Division during the operation by Combat Command B on the River Vire near St Fromond on July 9, 1944. This M5A1 is passing a 90mm antiaircraft gun that had been deployed to deal with the threat of tanks from the 2.SS-Panzer-Division that was counterattacking the Vire river bridgeheads. The name on the tank appears to be “L-on-Wheels”.

In contrast, the US armored divisions had combat command headquarters to foster combined arms integration down to battalion level, regularly mixing tank, armored infantry, and armored field artillery battalions for specific missions. Furthermore, these combat commands went a step further and regularly deployed multiple task forces that integrated tank, armored infantry, and armored field artillery at company level.

The British problems with tank-infantry integration have sometimes been attributed to the resistance of the armored regiments to become entangled with the slow-moving infantry, which inhibited their ability to maneuver. Amplifying this was the reluctance of the British Army to become involved in grinding attritional battles depending on the infantry. The nightmares of the 1916–18 trench war made the British Army understandably averse to heavy casualties. Tank-centered combat seemed to offer an alternative to infantry-centered tactics, even if it resulted in heavy tank losses.

B ENGAGEMENT AT RAURAY DURING

OPERATION *EPSOM*, 27 JUNE 1944



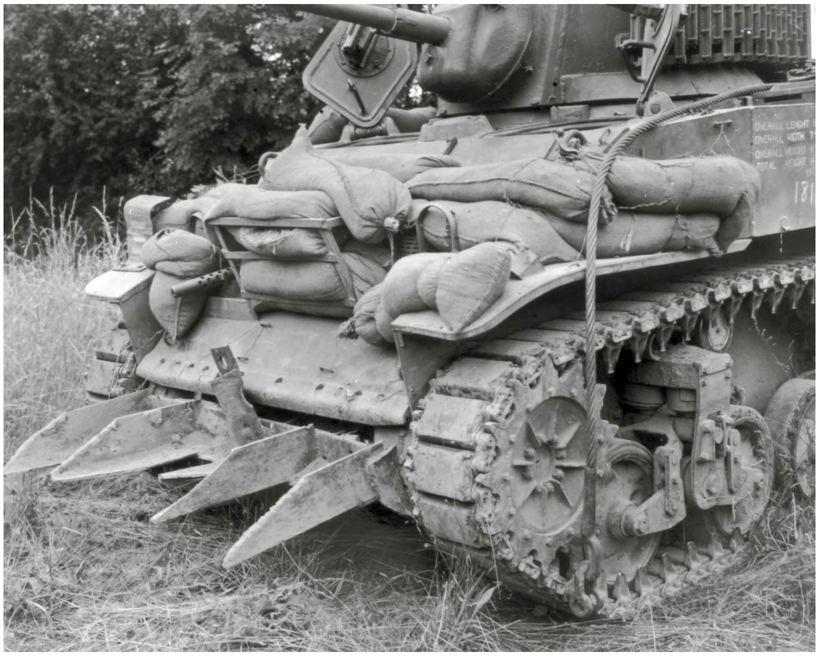
There was a violent series of clashes between British and German tanks around Rauray during Operation *Epsom*. This account from a 2nd British Army report records the attack by the Sherman III "Akilla" commanded by Sgt George Dring of A Squadron, 1st Nottinghamshire Yeomanry (Sherwood Rangers), 8th Armoured Brigade while in support of 147th Infantry Brigade on June 26. The account here has been slightly edited for clarity.

"Sgt Dring started out south from Fontenoy-le-Pesnil with his 75mm (Sherman) and fell in with a MK IV (PzKpfw IV) which he shot through the driver's visor. It brewed up and the crew baled out. Next he fell in with a Tiger at 1,000 yds. The Tiger fired whilst Dring was traversing but missed. Dring then pumped 5 shots in without further retaliation. The last one hit the driver's periscope and the crew baled out. Next he came on a Panther at the cross roads. This he got with one shot with APC in front of sprocket and the crew baled out. Hit at normal and at about 500 yds range, it brewed up. Next he took on a Tiger at 1,400 yds just outside Rauray. He fired 6 shots of which 4 hit and the last one brewed it up. Troop commander thought he had missed it and only hit the wall behind. Sgt Dring's next shot brought the sparks and the remark 'You don't see a brick wall spark like that'. This tank has been seen and is much shot up. It now has one scoop in front vertical plate, five penetrations in rear, four strikes with no penetrations in rear, plus a scoop and one plate of engine hatch smashed."

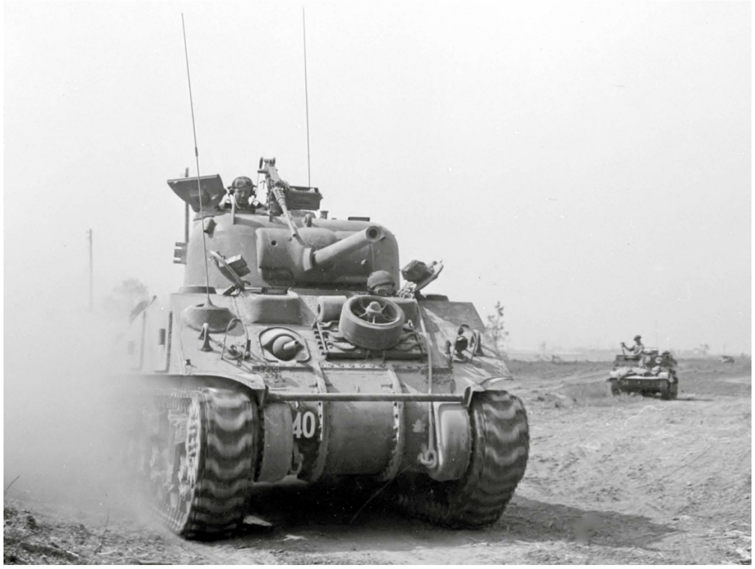
Dring’s victims that day included two PzKpfw IVs of 5./SS-Pz.Rgt. 12, Panther 204 of 2./SS-Pz.Rgt. 12 commanded by SS-Ostuf Helmut Gaede and two Tigers, 334 and 233 of s.SS-Pz.Abt. 101. Here, Dring’s tank “Akilla” is seen driving past Tiger 114, knocked out during the engagement by Lt Fearn of A Squadron. That day, Tiger 114 was commanded by SS-Hstuf Rolf Mobius. By the end of the day, the Sherwood Rangers had knocked out about 15 German tanks, at a cost of two Shermans.

Dring’s tank had its name on the side along with the census number in white. There is a cartoon on the side appliqué armor plate, apparently “Baboon McGoon” from the Al Capp comic strip. The markings on the transmission cover include the unit insignia of the 8th Armoured Brigade, a red fox head, over the AoS which was 996 for the Sherwood Rangers.

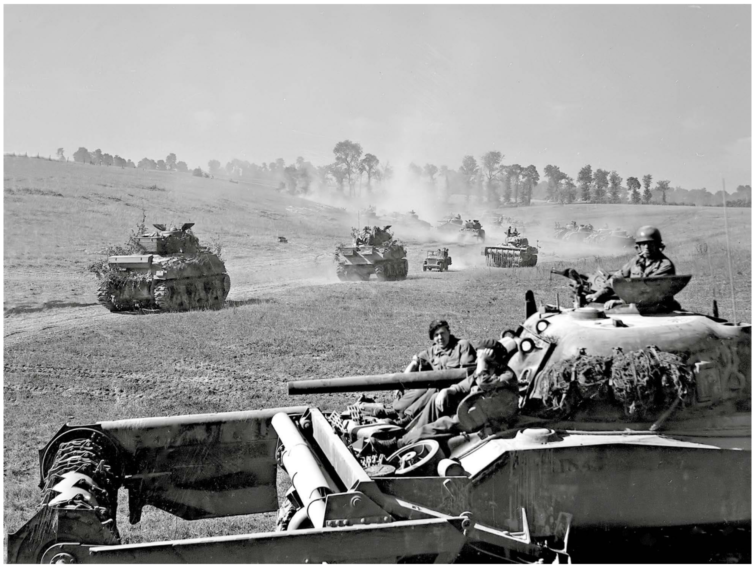
US armored officers were surprised by the large reserve of tanks held by the British 2nd Army, offering a 25–30 percent replacement rate compared to the miserly 7 percent per month of the US Army reserves. It should be recalled that the British Army was allotted 12,000 medium tanks (56 percent) of US 1943 tank production via Lend-Lease to equip 12 British/Commonwealth armored divisions and other units while the US Army was allotted about 7,500 medium tanks (35 percent) for 18 US/French armored divisions and other units, with the remainder going to the Soviet Union. The British Army built up a substantial cushion of tank reserves that could be expended as a means to reduce casualties.[1] Montgomery's tactics displayed a willingness to sacrifice steel instead of blood.



The difficulty of operating tanks in the Norman hedgerow country led to several US attempts in July 1944 to develop hedgerow cutters for tanks. Some early types such as the "Salad Fork" and "Green Cutter" were used in combat experimentally in mid-July, but were not entirely successful. The best of the designs was proposed by Sgt Curtis Culin of the 102nd Cavalry Reconnaissance Squadron. This one was assembled by the 705th Light Ordnance Maintenance Company and attached to an M5A1 light tank of D Company, 735th Tank Battalion on July 19, 1944 prior to Operation *Cobra*.



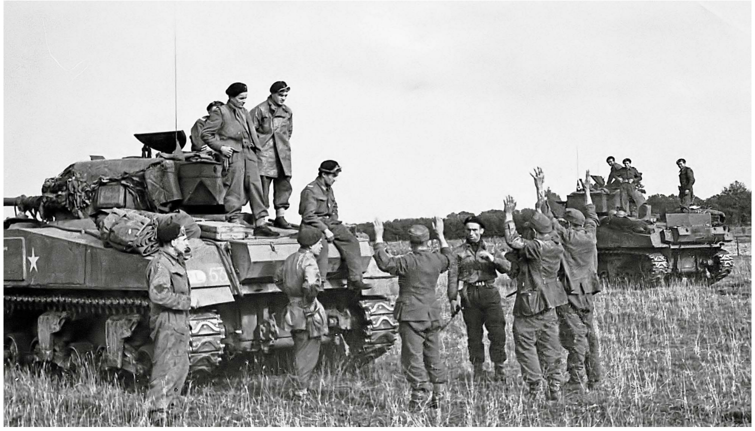
A Sherman V Control of the headquarters, 4th Canadian Armoured Brigade, during phase two of Operation *Totalize* on August 8, 1944. This Control tank has additional radios, with one antenna on the turret and the second on the hull pot adjacent to the bow gunner. (LAC PA-131373)



Sherman tanks of the 10th Canadian Armoured Regiment (The Fort Garry Horse) taking part in Operation *Tractable* moving out near Bretteville-le-Rabet on August 14, 1944. This unit was part of the 2nd Canadian Armoured Brigade and supported the 3rd Canadian Infantry Division. In the foreground is a Sherman Crab flail tank of the 79th Armoured Division, attached to the Canadians for the attack. (LAC PA-113659)

Most armies' doctrine at this point in the war favored the use of armored divisions for the exploitation role, but discouraged their use in obtaining penetrations of enemy defenses. This was British doctrine, but on several notable occasions during the Normandy campaign, the British Army attempted to use armored divisions to obtain breakthroughs. This usually led to failure and heavy tank losses. This started in late June with the commitment of the 11th Armoured Division to spearhead Operation *Epsom*, and continued through the battles around Caen in July. Montgomery looked for alternatives to infantry to secure a penetration of the German defenses. During Operation *Charnwood* on July 7–8, he attempted to use heavy bombers to blast a gap in place of infantry.

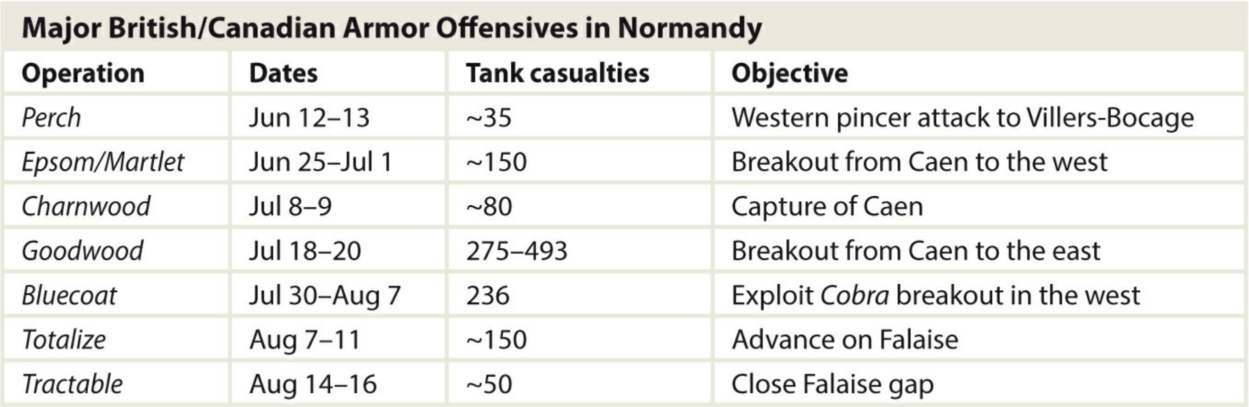
The next major offensive, Operation *Goodwood* on July 18, was one of the largest uses of massed armor by 21st Army Group and one of the most controversial. Three armored divisions conducted an armored cavalry charge towards the Bourguébus ridge. The plan had many flaws, including lack of adequate infantry, congestion of too large a maneuver force in too small a space, and the likelihood of the tanks being outside artillery support range on the final approaches to the ridge. In the event, the battle ended in exceptionally heavy casualties without gaining its objectives. Montgomery led Eisenhower to expect dramatic gains from *Goodwood*, perhaps even an exploitation phase towards Falaise. When it flopped, recriminations followed that have echoed to this day.



The crew of a Sherman V of the 24.Pułk ułanów, 1.Dywizja pancerna (24th Lancers, Polish 1st Armoured Division) collects German prisoners following the fighting to close the Falaise Gap in mid-August 1944. The Arm of Service (AoS) symbol on the rear is a 53 on a red square as the junior regiment of the brigade.

A Stuart VI of Lt Adam Dzierżek of the reconnaissance platoon of 24.Pułk ułanów after the fighting to seal the Falaise Gap in August 1944. The regimental tactical symbol for the regiment (white 53 on red square) has been painted on the back of the motorcyclist's helmet.

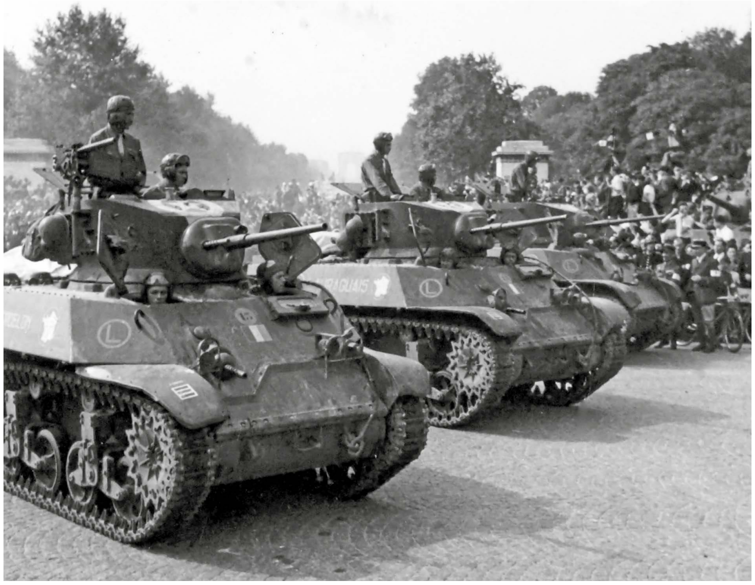
The scale of *Goodwood* tank losses has been controversial, with some reports indicating 493 tank casualties out of a starting strength of 1,163. However, a portion of these tank losses were recoverable and repairable. The number of irredeemable losses for *Goodwood* was closer to 275 tanks, according to recent studies. Also alarming was the disparity between British and German losses, with the Germans losing only some 85 tanks and AFVs. However, the 21st Army Group had ample reserve stocks of tanks on hand, an advantage that the Germans did not enjoy.



Major British/Canadian Armor Offensives in Normandy

Operation	Dates	Tank casualties	Objective
Perch	Jun 12–13	~35	Western pincer attack to Villers-Bocage
Epsom/Martlet	Jun 25–Jul 1	~150	Breakout from Caen to the west
Charnwood	Jul 8–9	~80	Capture of Caen
Goodwood	Jul 18–20	275–493	Breakout from Caen to the east
Bluecoat	Jul 30–Aug 7	236	Exploit *Cobra* breakout in the west
Totalize	Aug 7–11	~150	Advance on Falaise
Tractable	Aug 14–16	~50	Close Falaise gap

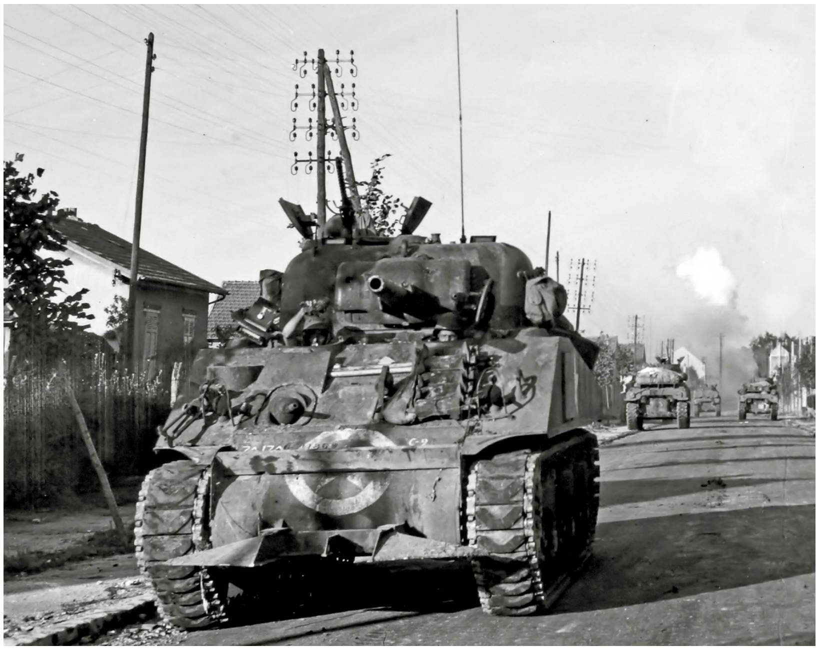
The fighting in the FUSA sector north of St Lô was very different than the Caen battles as far as tank use was concerned. The bocage country inevitably meant that this would be primarily an infantry struggle. The separate tank battalions had a great deal of difficulty operating in the bocage. Any tank foolish enough to try to crash over the hedgerow base would expose its thin belly armor to German antitank defenses on the other side. Through mid-July, the tank battalions attempted to develop new tactics to overcome the terrain difficulties. Although tank dozers were an obvious solution to creating gaps in the bocage, they were still available in too small a number. In early July 1944, tank battalions in FUSA began experimenting with a variety of improvised bocage-busters intended to break through the base of the hedgerows. The most successful of these were the Rhinoceros prongs developed by Sgt Curtis G. Culin Jr from F Troop, 102nd Cavalry Reconnaissance Squadron. It was demonstrated to senior commanders on July 14, and more than 500 were assembled, enough for about 60 percent of the tanks in FUSA taking part in the forthcoming Operation *Cobra*.



The moment of glory for Leclerc's 2e Division Blindée as they paraded down the Champs-Élysées in Paris on August 25, seen here as they turned on to the Place de la Concorde. The "circled L" marking on the front corners of these M3A3 light tanks indicated Groupe Tactique Langlade, one of the division's three combat commands. There were five of these M3A3 light tanks in the Peloton de protection of the headquarters company. From left to right, the tanks were L5 M. de Verdelon, L3 Lauraguais, and L2 Limagne. Not visible in this image was L4 Limousin.

A major impediment to tank-infantry cooperation in the bocage fighting was the lack of a radio suitable for rifle platoons to communicate with supporting tanks. Various improvised solutions were developed in July 1944. The most useful expedient was to attach a field telephone at the rear of the tank to permit infantrymen walking behind the tank to communicate with the crew inside. A major modification effort to add these to tanks of the separate tank battalions began prior to Operation *Cobra*.

The capture of St Lô on July 18 set the stage for Operation *Cobra*, the FUSA offensive to break out of the Normandy bridgehead. The German forces in this sector had been badly weakened by the attritional battles in the bocage over the previous two weeks. German panzer reserves in the area were weak since the German Army had kept most of its panzer force in the Caen sector to repulse the unrelenting British/Canadian armor offensives. This was the first major operation to make full use of the US armored divisions in Normandy. The attack started on July 25 with large-scale infantry attacks. On July 26, the 2nd and 3rd Armored Divisions were unleashed to begin the exploitation phase. Over the ensuing days, the German defenses in the St Lô sector collapsed and the unexpected speed of the offensive led to the entrapment of much of the 2.SS-Panzer Division and 17.SS-Panzergrenadier Division in the Roncey pocket.



An M4 medium tank of C Company, 17th Tank Battalion, 7th US Armored Division during the fighting near Melun on August 22, 1944. It is fitted with a T2 Douglas device, a type of hedge-cutter developed by the 3rd Armored Division.

A Cromwell tank of the 2nd Welsh Guards, Guards Armoured Division passes through Trie-Château, east of Gisors, on August 31, 1944 during the race to cross the river Seine.

Montgomery responded to the *Cobra* success by launching Operation *Bluecoat* to keep the Germans from blocking the American breakout. This operation emanated from the western sector of the 2nd British Army, where the terrain shifted from open farmland to bocage. The resultant fighting was costly in tank casualties, though it did impede the shift of German panzer resources against the American spearheads. By this stage of the fighting, the British armored divisions were adapting to the Normandy conditions and *Bluecoat* demonstrated a greater ability in combined arms tactics.

On August 1, Patton's Third US Army (TUSA) was activated, and its two spearheads, the 4th and 6th Armored Divisions, began a rapid advance along the coast towards Brittany. The original *Overlord* plan assigned Patton to capture the ports in Brittany, including Brest and Lorient. The 6th Armored Division raced to Brest in record time. However, US commanders began to question whether the *Overlord* plan to seize Brittany made any sense compared to the opportunities further east towards the River Seine and Paris. Hitler was so alarmed by the *Cobra* breakthrough that he ordered a panzer counterattack to cut off Patton's TUSA at Avranches. This required the transfer of most of the best panzer units from the Caen sector to the west, changing the balance of German resources from the British sector to the American. Operation *Lüttich* reached Mortain on August 7, but quickly fizzled out.

August 7 was the beginning of the end of the German Army in Normandy. The German *Lüttich* offensive was too weak and uncoordinated to have any chance of success. At the same time, it denuded the Caen sector of vital panzers. Montgomery responded by launching Operation *Totalize* using the 1st Canadian Army. The Canadians, aware of the problems of tank-infantry integration, came up with an ingenious solution for moving infantry as fast as the tanks. They converted surplus M7 105mm SP howitzers into improvised Kangaroo infantry carriers by removing the gun. In the event, *Totalize* petered out on August 10 short of its goals. But the Canadians and the Polish 1st Armoured Division had advanced 8 miles and put Falaise within reach.

In the American sector, August 7 was vital since it marked the shift in Allied plans for Patton's TUSA from Brittany to a race eastward to exploit the void in German defenses south of Normandy. As a result of this reorientation, as well as *Totalize*, the two jaws of the Allied armored pincers were now approaching a juncture near Falaise-Argentan, potentially trapping the Wehrmacht. Furthermore, a portion of Patton's tanks were now aimed at a second, deeper envelopment on the Seine. On August 14, Montgomery launched Operation *Tractable*, which lasted for nearly a week and constituted the northern pincer at Falaise. Hitler belatedly authorized a withdrawal from Normandy on August 15, but the Falaise gap was not sealed until August 21.

Note

[1] On average, one tanker was killed and one wounded every time a tank was knocked out.

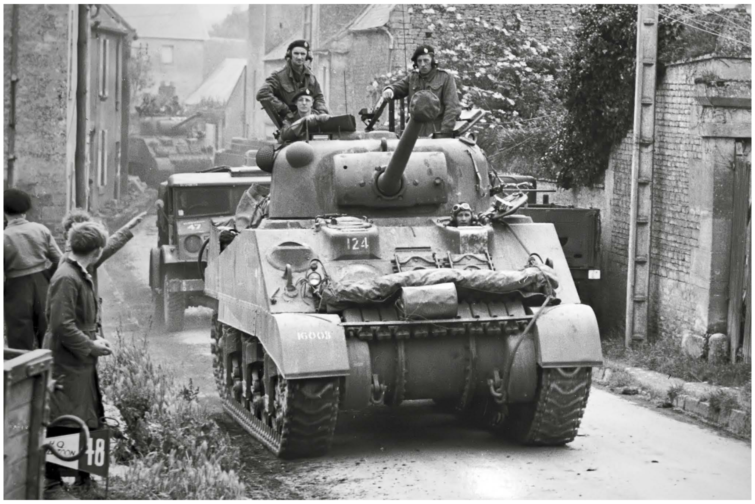
DOCTRINE AND ORGANIZATION

British tank organization in Normandy

British armored divisions in 1944 were based around an armored brigade, an infantry brigade, and divisional troops. Each armored brigade generally had three armored regiments, an armored reconnaissance regiment, and a motor (infantry) battalion. The division's infantry brigade had three lorried infantry battalions. Divisional troops included two field artillery regiments (one towed, one SP) and an armored reconnaissance regiment. The war establishment for a British armored division in June 1944 was 262 capital tanks, 44 light tanks, 29 OP tanks, 26 antiaircraft tanks, 24 M10 SP guns, and 24 SP field guns. Canadian and Polish armored divisions followed the British pattern.

The 79th Armoured Division was the exception and was not a conventional tank formation in either organization or doctrine. Rather, it was an administrative formation designed to manage a diverse assortment of specialized tanks, dubbed "Armored Funnies" or "Hobart's Funnies" after Gen Percy Hobart, the division commander. Its original mission was to train and organize the specialized tank formations for Operation *Neptune* (the assault phase of *Overlord*), including the DD amphibious tanks under the 27th Armoured Brigade and specialized engineer tanks such as the Crab flail tanks, Churchill Crocodile flamethrower tanks, and Churchill AVRE (Armored Vehicle Royal Engineers) under the 1st Assault Brigade Royal Engineers. Following the D-Day landings, the DD tank regiments reverted back to normal armored regiments and were re-subordinated to other formations. The 79th Armoured Division retained control over the other specialized armored and engineer regiments, including the CDL night-fighting tanks once they arrived in France.

The naming conventions of the British armored regiments differed from US Army practices. In terms of tank strength, these regiments were similar to US Army tank battalions, consisting of three squadrons, each with four troops. The British regiments retained cavalry terms for their sub-formations, so British squadrons were comparable to American tank companies, and British troops to American platoons. A British armored regiment in 1944 typically had 61 M4 (Sherman) tanks and 11 Stuart tanks, while an American tank battalion had 59 medium tanks and assault guns and 17 M5A1 light tanks.



A Sherman VC-17 pdr leads a column from the 44th RTR, 4th Armoured Brigade on June 8, 1944, shortly after landing in France. The "16008" marking on the mudguard is a unit serial number used by British forces to maintain security while facilitating embarkation movements.

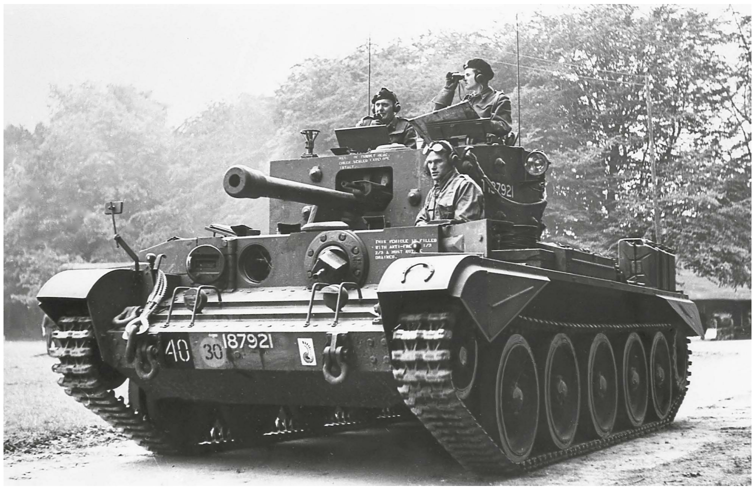
The diverse nomenclature of British armored regiments stemmed from the varying origins of the units. Many were from the Royal Tank Regiment (RTR). Others traced their lineage back to cavalry or yeomanry regiments. Also confusing to outsiders was the naming practice such as 13/18 Hussars, which resulted from the amalgamation of two regiments into a single regiment in order to retain regimental traditions.

The Canadian Army followed British naming practices, but with their own twist. Canadian armored regiments were usually numbered, for example 27th Armoured Regiment, but were better known by their traditional regimental name, in this case, the Sherbrooke Fusiliers. Polish armored regiments were generally named after regiments from the 1939 campaign, in many cases those associated with the 10th Mechanized Brigade that had been led in 1939 by Stanisław Maczek, the divisional commander in 1944.

A Cromwell IV of the 6th Airborne Armoured Reconnaissance Regiment during the advance toward the Seine in late August 1944. This unit deployed Tetrarch light tanks from Hamilcar gliders on D-Day. These were inadequate for prolonged combat, and so in August were supplemented by eight Cromwell tanks, serving in two troops of A Squadron. The crew can be seen wearing paratrooper smocks and their characteristic red beret. (LAC)

In comparison to US Army armored divisions, the British armored division of 1944 had a different mix of component elements: roughly four armored, four motor/lorried infantry, and two artillery. The US Army armored divisions on the 1943 pattern had three tank, three armored infantry, and three armored artillery elements. A British division had 262 capital tanks and 33 light tanks, while the US armored division on the 1943 light pattern had 186 medium tanks and assault guns and 100 light tanks.

Most British armored divisions were committed to the Northwest Europe campaign. Of the six British armored divisions in service in the summer of 1944, five were in France and one in Italy. Of the five Dominion armored divisions, the Canadian 4th Armoured Division was in France and Canadian 5th Armoured Division in Italy; the South African 6th Armoured Division was also in Italy; and the Indian 31st Armoured Division was assigned to the Middle East and 43rd/44th Armoured Division to India. The Polish 1st Armoured Division was an outlier, having been based on the 10th Mechanized Brigade that fought in Poland in 1939. It escaped and was re-equipped, fighting again in France in 1940. It escaped again to Britain after fighting in the 1940 Battle of France. This division was trained and equipped in Britain, but fought in Normandy alongside the Canadians.



The Cromwell IV command tank of Gen Stanisław Maczek, commander of the 1.Dywizja pancerna (Polish 1st Armoured Division). Beside him in the turret is Capt Tadeusz Wysocki, the divisional information officer. At a later date, the tank had the name "Hela" painted in the upper right corner of the turret front. The horseshoe on the left mudguard is a symbol of Maczek's earlier command of a mechanized cavalry brigade in the 1939 Polish campaign.

Besides the armored divisions, there were usually one or two armored/tank brigades at corps level that could be assigned to the infantry divisions for support. The tank brigades were the original infantry support formation. The armored brigades emerged as separate formations in 1942 when armored division organization was compressed to a single armored brigade, freeing the other brigade for independent use. The initial distinction between the tank and armored brigades was that tank brigades employed infantry tanks whereas armored brigades had cruiser tanks. As detailed below, Montgomery preferred a doctrine based around a universal tank, so these distinctions began to blur. In the summer of 1944, armored brigades remained equipped with cruiser tanks/capital tanks, but tank brigades in some cases employed the Sherman tank as well as the Churchill infantry tank. On occasion, the armored brigades were used to form armored brigade groups, which added a motor battalion. These could be used as mini-armored divisions. By the end of August 1944, there were a total of five independent armored brigades and two tank brigades under Montgomery's command.

21st Army Group Armored Order of Battle, August 31, 1944	
21st Army Group	**79th Armoured Division**
1st Canadian Army	**I Canadian Corps** 31st Tank Brigade 33rd Armoured Brigade II Canadian Corps

	2nd Canadian Armoured Brigade 4th Canadian Armoured Division 1st Polish Armoured Division
2nd British Army	**VIII Corps** 6th Guards Tank Brigade 34th Tank Brigade
	XII Corps 4th Armoured Brigade 7th Armoured Division
	XXX Corps 8th Armoured Brigade Guards Armoured Division 11th Armoured Division

US tank organization in Normandy

FUSA was subordinate to Montgomery's 21st Army Group from D-Day until the end of July 1944. On August 1, Lt Gen George Patton's TUSA was formally declared operational and so Lt Gen Omar Bradley was elevated from FUSA commander to head the new 12th Army Group, which included both FUSA and TUSA.

The principal US armor formations in Normandy through June and early July were the separate tank battalions and tank destroyer battalions. These were attached to infantry divisions to provide armored support. Although armored divisions began arriving in the days after the D-Day landings, they were held in reserve since their mission was the exploitation of breakthroughs, not the penetration of enemy defenses.

Nearly all separate tank battalions were organized on a standard 1943 Table of Organization and Equipment (TO&E) consisting of three medium tank companies and a light tank company. These battalions had an authorized strength of 53 M4 medium tanks, six M4 (105mm) assault guns, and 17 M5A1 light tanks. There were two exceptions to this configuration. The 744th and 759th Tank Battalions (Light) had three light tank companies and a total of 59 M5A1 light tanks, and three M8 75mm Howitzer Motor Carriage (HMC) assault guns. There were also six Tank Battalions (Special) equipped with 54 Leaflet night-fighting tanks and 18 M4 medium tanks. These used the top-secret Canal Defense Light for night operations, but in the event, they never saw combat in Normandy.

An M4 105mm assault gun of the 8th Tank Battalion, 4th Armored Division passes through Avranches on its way into Brittany in early August 1944. The 8th Tank Battalion was the only element of the 4th Armored Division to use painted camouflage in France.

The tank battalions were managed by an Armored Group headquarters, usually with two or three subordinate tank battalions. These were deployed at corps level. The original idea was that the Armored Group organization would enable a corps to concentrate its tank battalions into a combined formation for offensive operations. In practice, this proved unrealistic. Since the Tunisian campaign in the spring of 1943, the US Army had come to realize that each infantry division needed an attached tank battalion to provide battlefield support. Although the tank battalions were not formally integrated into infantry division organization, the practice began of attaching a tank battalion to each infantry division involved in offensive operations. As a result, the Armored Group headquarters became largely an administrative unit rather than a tactical unit. By the later stages of the Normandy campaign, the Armored Group commander usually served as the armored advisor to the corps headquarters.

Deployment of First US Army Separate Tank Battalions, July 1, 1944	
V Corps 1st Infantry Division 2nd Infantry Division	**3rd Armored Group** 759th Tank Battalion (Light) 745th Tank Battalion 741st Tank Battalion
VII Corps 4th Infantry Division 9th Infantry Division	**6th Armored Group** 4th Infantry Division 746th Tank Battalion

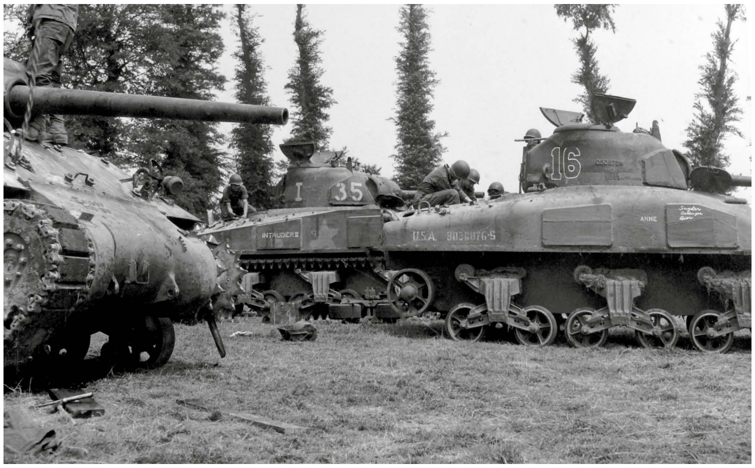
VIII Corps 79th Infantry Division 90th Infantry Division	**6th Armored Group** 749th Tank Battalion 712th Tank Battalion
XIX Corps 28th Infantry Division 29th Infantry Division 30th Infantry Division	**7th Armored Group** 744th Tank Battalion 747th Tank Battalion 743rd Tank Battalion

Tank destroyer battalions in Normandy came in two varieties, SP and towed. Through the summer of 1943, all tank destroyer battalions had been SP, but the head of US Army Ground Forces, Lt Gen Lesley McNair, misjudged the lessons of the Tunisian campaign and decided to begin converting some of the battalions to towed 3in guns.

A column of M5A1 light tanks of B Company, 759th Tank Battalion (Light) in Montebourg, Normandy, in July 1944. For most of July, it conducted patrols and mop-up operations on the Cotentin peninsula following the liberation of Cherbourg. The battalion was one of only two in the ETO in the light tank configuration.

The SP tank destroyer battalions had three tank destroyer companies and a total of 36 3in gun-motor carriages (GMC). The towed battalions had 36 towed 3in antitank guns drawn by half-tracks. In the summer of 1944, the usual practice was to assign the SP battalions to the armored divisions and the towed battalions to the infantry divisions. The towed battalions proved to be a serious mistake and nearly impossible to use effectively in the hedgerow country of Normandy. As a result, SP battalions were sometimes attached to infantry divisions, depending on availability. The US Army in the European Theater of Operations (ETO) did not finally begin to abolish the towed battalions until the Ardennes campaign in December 1944 proved the dysfunctional character of the units compared to SP battalions.

US Army armored divisions in Normandy followed two organizational patterns. The standard September 1943 TO&E had a balanced mixture of three tank battalions, three armored infantry battalions, and three armored field artillery battalions. Although the plans had been to convert all armored divisions to this configuration, the 1st Armored Division in Italy waited until the summer of 1944 to convert from the earlier 1942 TO&E due to its combat commitments. The two divisions in Britain in the autumn of 1943, the 2nd and 3rd Armored Divisions, retained a modified version of the 1942 TO&E. The reason for this was largely the result of the disagreement between the ETOUSA commander, Lt Gen Jacob Devers, and the head of Army Ground Forces, Lt Gen Lesley McNair, over the reorganization. Devers had previously commanded the Armored Force and was unhappy about the new 1943 TO&E. As a result, he allowed the two armored divisions then in Britain to retain the 1942 "heavy" organization of two armored regiments (three tank battalions each) and one armored infantry regiment (three battalions). Consequently, the equipment authorizations for the 1942 heavy and 1943 light configurations differed, for example with 158 M5A1 light tanks vs 83, and 232 M4 medium tanks vs 168.



An Ordnance repair yard in Normandy on July 18, 1944 in the days prior to Operation *Cobra*. To the left is an M10 3in GMC, in the center an M4 "I-35 Intruder II" of I Company, 3/66th Armored, 2nd Armored Division, while to the right is an M4A1, tactical number 16, of the 70th Tank Battalion. US tank markings were idiosyncratic to their units. Both the 2nd and 3rd Armored Divisions used block gothic tactical numbers on their turrets, while the 70th Tank Battalion used a unique style of red numbers with white outlines.

The one change that Devers did support was to eliminate the light/medium tank battalion distinction in the heavy divisions and shift to the mixed configuration of two medium tank companies and one light tank company in each battalion. The retention of the 1942 TO&E led to some oddities in equipment, with the 2nd and 3rd Armored Divisions retaining the M8 75mm HMC instead of newer types such as the M4 (105mm) assault gun. These discrepancies were ironed out through 1944.

Unlike the British Army in Normandy, the US Army continued to see significant growth from the beginning to the end of the campaign. Starting at one field army with two armored divisions, by the end of August there were two field armies (First and Third) and seven armored divisions. The scale of deployment of the separate tank battalions also increased, from ten at the end of June to 15 at the end of August.

US Army Tank Strength in Normandy, June–August 1944*

	Jun 30 44	Jul 23 44	Aug 29 44
M4 (75)	790	1,125	1,700
M4 (76)	0	102	262
M4 (105mm)	0	64	163
M5A1	319	715	1,062
Total	1,109	2,006	3,187

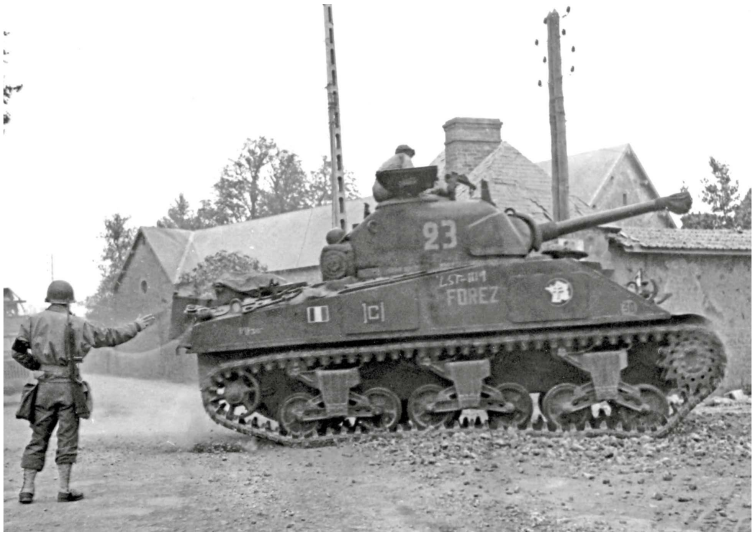
**Includes armored divisions and tank battalions; no data on mechanized cavalry groups*

First US Army Tank Strength and Losses, June–July 1944

	Days in Combat		Avg Operational Daily*		Tank Losses*	
	Jun	Jul	Jun	Jul	Jun	Jul
2nd Armored Division	5	18	206+125	221+151	21+14	45+2
3rd Armored Division	2	18	195+98	249+157	8+1	40+0
70th Tank Battalion	17	16	40+16	50+15	33+4	18+2
709th Tank Battalion		5		60+18		10+0
712th Tank Battalion		16		57+17		21+0
737th Tank Battalion		9		55+17		4+4
741st Tank Battalion	6	6	36+17	61+18	53+0	6+4
743rd Tank Battalion	8	17	39+17	54+17	16	26+2
744th Tank Battalion		3		57+3		0+5
745th Tank Battalion	21	13	52+17	60+18		1+0
746th Tank Battalion	23	29	34+17	45+17	43+1	48+3
747th Tank Battalion	10	7	44+17	56+18	37+4	8+0
749th Tank Battalion		12		54+18		13+0
759th Tank Battalion (Light)	1	3	0+34	0+54	0+12	0+12
Sub-total			***646+358***	***1,079+538***	***211+36***	***240+34***
Total			***1,004***	***1,617***	***247***	***274***

**M4 medium + M5A1 light*

One of the armored divisions of the 12th Army Group was the 2e Division Blindée (2e DB), led by Général de Division Jacques Leclerc. The division was raised and equipped by the US Army. It followed the 1943 TO&E, though its sub-formations retained traditional French regimental designations. Its equipment differed somewhat from US Army divisions in Normandy. For example, it was primarily equipped with the M3A3 light tank and M4A2 medium tank, neither of which was used regularly by the US Army in the ETO. This situation gradually changed through 1944 due to attrition, with replacement tanks coming from ETOUSA stocks. Leclerc's division was earmarked by de Gaulle as the premier unit for the ultimate prize, the liberation of Paris.



An M4A2 medium tank named Forez of the 1er Peloton, 2e Escadron, 12e Régiment de Chasseurs d’Afrique, 2e Division Blindée passing through La Haye-du-Puits shortly after landing from LST-1119 on August 4, 1944. This tank was knocked out during the fighting outside Paris on August 24.

TECHNICAL FACTORS

British tanks and AFVs

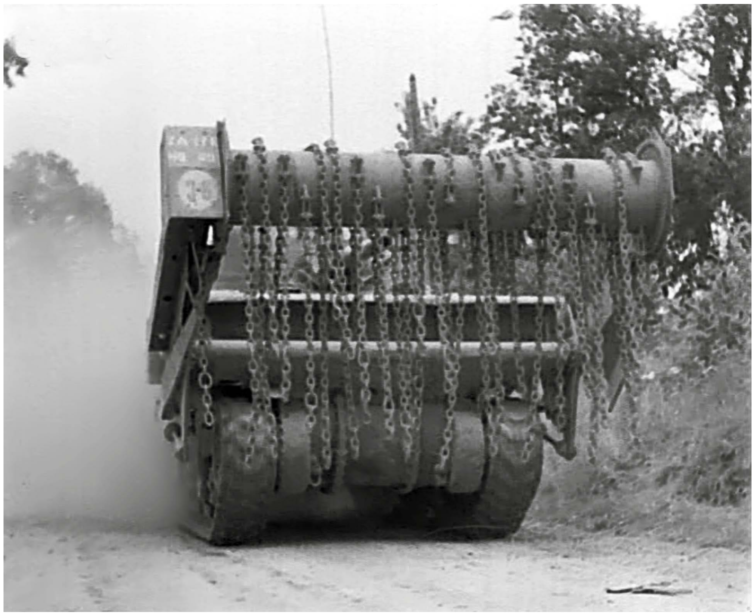
British armor units in Normandy had an exceptionally diverse selection of tanks and AFVs. To begin with, British armor doctrine distinguished between cruiser tanks and infantry tanks. Cruiser tanks were the primary weapon of the armored divisions and brigades. These tanks accented speed and mobility over protection, since they were intended to conduct exploitation missions. Their firepower tended to rely on guns that emphasized antitank performance. The infantry tanks, as their name implies, were intended for infantry support, and were the primary types in the tank brigades. These tanks accented protection over mobility, since it was presumed that they would regularly face enemy antitank defenses in the course of their missions.

An M10 3in GMC of B Company, 703rd Tank Destroyer Battalion, 3rd Armored Division on a narrow side street in St Fromond on July 7, 1944, trying to bypass the traffic jams during the advance to the Vire River bridgehead.

Aside from the various categories of tanks, the British Army operated both its own tanks as well as a substantial number of American-built ones obtained through the Lend-Lease program. In late 1942, the British and US governments approved the Weeks-Somervell Agreement, under which the

United States agreed to provide 10,000 medium tanks in 1943. Due to British protests, this was raised to 12,000 in February 1943. The aim of the agreement was to relieve the pressure on the overextended British armament industry, as well as to standardize between the armies. Britain was eventually assigned almost half of US 1943 medium tank production, receiving 10,464 of 21,250 tanks. The British requirements for 1944 were 8,500 medium tanks, but in the event only 5,031 were assigned.

The Canadian, Polish, and Czechoslovak units that served in the 21st Army Group were supplied with tanks and AFVs from British stocks and did not receive separate Lend-Lease allotments.



The First US Army ordered 25 Crab flail tanks from the UK in February 1944 for D-Day, but they were not delivered until July that year. This is one of those serving in the 17th Armored Engineer Battalion, 2nd Armored Division during operations near St Lô on July 18, 1944. This unit had previously operated Scorpion flail tanks on Sicily in July 1943.

The distinction between cruiser and infantry tanks began to break down in 1942 with the advent of American medium tanks via Lend-Lease such as the M3 Grant/Lee and M4 Sherman, which did not fit comfortably in either category. They employed a dual-purpose 75mm gun that was useful in either the cruiser or infantry tank role. Aside from the technological erosion of the cruiser/infantry tank distinction, General Montgomery was not entirely comfortable with the rigid distinction between the two categories, preferring a “universal tank” that could be tasked with either mission as the circumstances demanded. At a January 13, 1944 meeting, he decreed that henceforth, there would only be two categories of tank – "capital" tanks, including both the infantry and cruiser tanks, and light reconnaissance tanks, that retained their traditional cavalry/reconnaissance role.

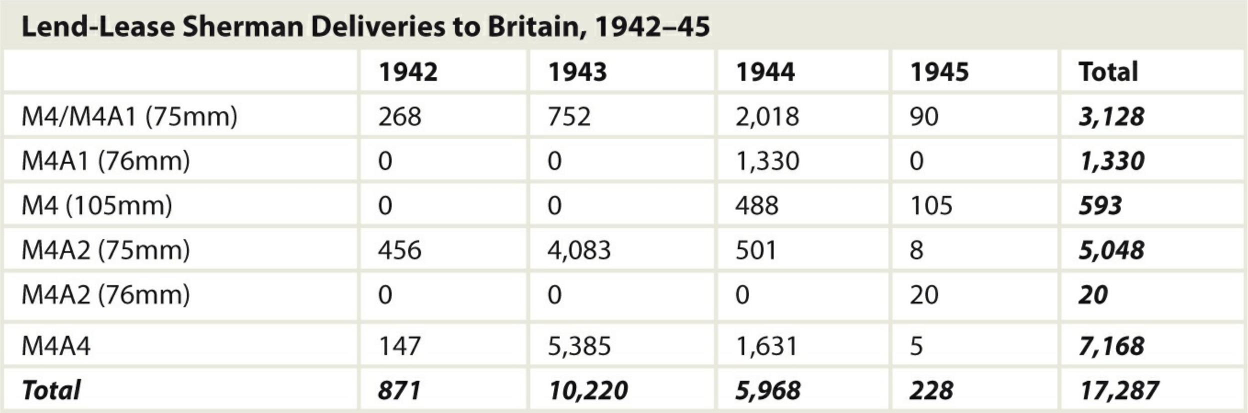
British/Canadian/Polish Tank and AFV Strength in 21st Army Group, June 1944	
Sherman I*	275
Sherman IC	2
Sherman II*	192
Sherman II DD	76
Sherman III*	490
Sherman V*	969
Sherman V DD	189
Sherman VC	340
Sherman V Crab	180
Sherman sub-total	***2,713***
Grant CDL	162
Cromwell IV/V/VII*	610
Cromwell VI	55
Challenger	18
Cromwell sub-total	***845***
Churchill III	150
Churchill IV*	266
Churchill VI	86
Churchill VII	113
Churchill V	69
Churchill sub-total	***684***
Stuart III	198
Stuart V	177
Stuart VI	52
Stuart sub-total	***427***
Total	***4,669***

**Includes Observation Post (OP) versions*

British cruiser tanks

The primary British cruiser tank was the American-supplied M4 Sherman. Shermans were most commonly associated with the armored divisions and armored brigades. However, some British tank brigades such as the 1st Tank Brigade were equipped with Shermans, another sign of the dilution of the infantry/cruiser tank distinction.

Four Sherman versions were in common service in Normandy in 1944, distinguished mainly by engine types. The selection of Shermans available to Britain became more constricted in 1943. The US Army preferred the M4/M4A1/M4A3 and the Red Army asked for more M4A2 diesel-powered tanks. As a result, the M4A4 Sherman V became the prime British version in 1943; the UK received 7,168 (96 percent) of the 7,499 M4A4s produced. It was powered by a Chrysler A57 multi-bank engine that consisted of four bus engines mounted around a common drive-shaft.



Lend-Lease Sherman Deliveries to Britain, 1942–45

	1942	1943	1944	1945	Total
M4/M4A1 (75mm)	268	752	2,018	90	***3,128***
M4A1 (76mm)	0	0	1,330	0	***1,330***
M4 (105mm)	0	0	488	105	***593***
M4A2 (75mm)	456	4,083	501	8	***5,048***
M4A2 (76mm)	0	0	0	20	***20***
M4A4	147	5,385	1,631	5	***7,168***
Total	***871***	***10,220***	***5,968***	***228***	***17,287***

On March 9, 1943, the British General Staff established a new “Policy on Tanks” which noted that “Fulfillment of their normal role necessitates that the main armament on the greater proportion of tanks of the medium class should be an effective HE weapon and at the same time as effective a weapon as possible against enemy armour of the type so far encountered during war. The smaller proportion of tanks of the medium-class require a first-class anti-tank weapon for the engagement, if necessary, of armour heavier than that against which the dual-purpose weapon referred to above is effective.” The 75mm gun was viewed as a satisfactory weapon for firing high-explosive ammunition, but its antitank capabilities were becoming inadequate in the face of newer German tanks such as the Tiger and the later Panther.

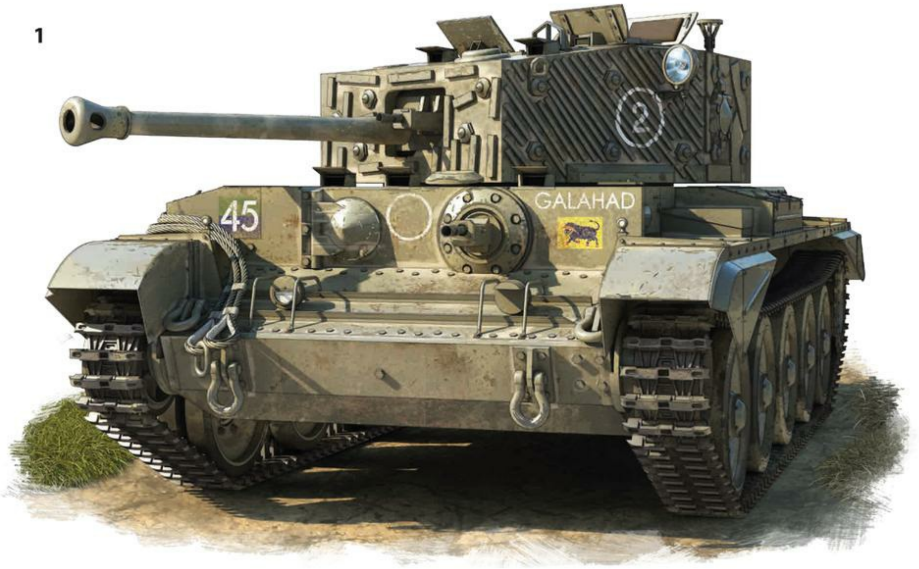
A Sherman V of the 10th Canadian Armoured Regiment (The Fort Garry Horse) near Faubourg de Vaucelles in July 1944 around the time of Operation *Atlantic*. (LAC)

A Sherman V leads a column of tanks of the 11th Armoured Division through the ruins of Flers on August 17, 1944.

This led to a new program to adapt the existing towed 17-pdr antitank gun as a tank gun. In December 1943, the Royal Ordnance Factory was awarded a contract for the conversion of 2,100 Sherman Vs to carry the 17-pdr; in the event, other versions were also converted, principally the Sherman I. Conversion of Sherman tanks to carry the 17-pdr gun began in January 1944. The modified tanks were designated with a “C” suffix in their designation, for example, Sherman VC. The 17-pdr version was eventually nicknamed as the Firefly. There were 342 Fireflies in service with the 21st Army Group in June 1944, about 13 percent of Sherman strength. In the first phase, the Sherman 17-pdr was issued on a scale of one per troop, with a plan to gradually increase this. Some regiments concentrated their four 17-pdrs in a single troop rather than spreading them out. The need for a larger proportion of 17-pdr Shermans became a more pressing issue after widespread contact with large numbers of German Panther tanks in Normandy in June 1944.

C CROMWELL MK IV

1



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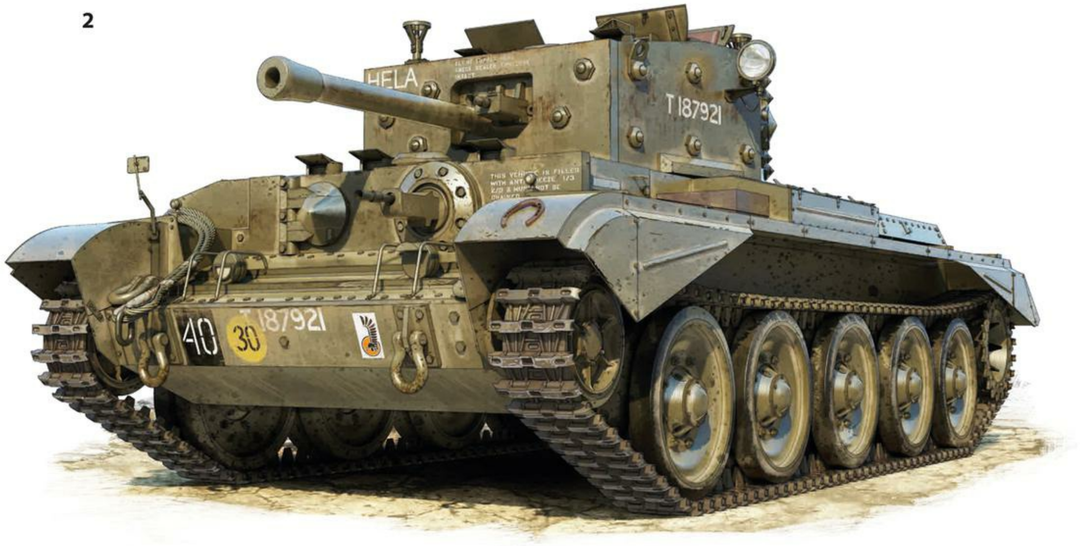


1. Cromwell Mk IV, 2 Troop, C Squadron, 2nd Northamptonshire Yeomanry

Curiously, this British unit adopted its own version of German Zimmerit antimagnetic mine covering by attaching thin strips of rubber over the turret armor of its tanks. This may have been in response to a close attack by Panzergrenadiers who attempted to knock out tanks of the unit during a close-quarter battle in Cheux during Operation *Epsom* in late June 1944. This particular troop used the names of Knights of the Round Table. The markings include an AoS (45 on a green/blue square), identifying the armored reconnaissance regiment of the armored division, and the divisional insignia of the 11th Armoured Division, a rampant bull. On the turret is the circle of C Squadron with the troop number within. This unusual modification was detailed by Bob Eburne in *Military Modelling* magazine Vol 29, No 11.

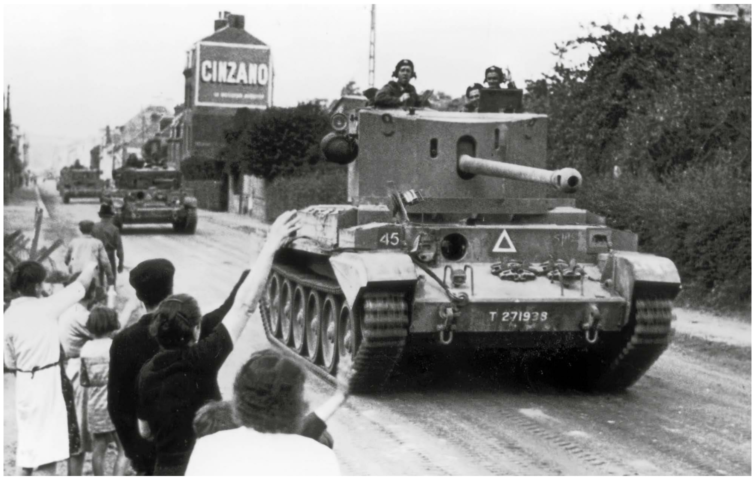
2. Cromwell Mk IV, Headquarters, 1st Polish Armoured Division

This Cromwell, named “Hela,” served in the divisional headquarters of the 1st Polish Armoured Division and was often used by the divisional commander, Gen Stanisław Maczek. It carries the usual British-pattern insignia including the AoS sign (white 40 on black square), the yellow/black bridge weight symbol, and the divisional insignia based on the Polish 17th-century winged hussars.

A Cromwell goes cross-country during the fighting near Caen in early July 1944. This tank is fitted with the "Normandy cowl," a feature added over the engine exhaust opening on the rear deck to prevent exhaust fumes from migrating back into the tank.

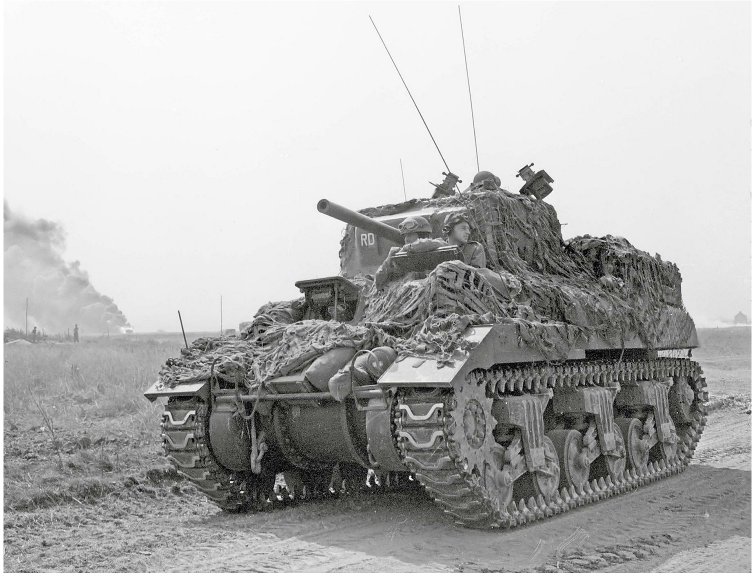
In general, the British Army confined the various Sherman sub-variants to specific units for ease of maintenance. The situation in June 1944 is summarized below. As will be noted, the Sherman I and Sherman II were used together in some units since they were mechanically identical except for the hull construction.

Assignment of Shermans in 21st Army Group	
Sherman I	33 Armoured Bde, 1 Tank Bde
Sherman II	4 Armoured Bde, 1 Tank Bde, 8 Armoured Bde (DD)
Sherman III	8 Armoured Bde, 27 Armoured Bde, 2 Canadian Armoured Bde
Sherman V	Guards Armoured Div, 1st Polish Arm Div, 4th Canadian Arm Div, 11th Arm Div, 30 Armoured Bde



A Challenger 17-pdr of the 15th/19th King's Royal Hussars, the divisional reconnaissance regiment of the 11th Armoured Division, is greeted by the townspeople of Flers in August 1944 as the division headed east toward the Falaise gap.

The Cromwell series was the second most common British cruiser tank, though there were only a third as many as Shermans in Normandy in June 1944. The inherent limit to Cromwell production was its Meteor engine, a derivative of the Rolls-Royce Merlin aircraft engine. Since aircraft production had priority and the Merlin was in high demand, Cromwell production was constrained by engine availability. The majority of the Cromwells were the variants armed with the British Ordnance 75mm gun that had entered production in October 1943. This 75mm gun fired the same ammunition as the American 75mm gun, but the gun itself was a derivative of the British 6-pdr, re-bored for 75mm ammunition. A smaller number of Cromwell VIs served in Normandy as a close-support variant armed with a 95mm howitzer. These were allotted on a scale of two per armored or reconnaissance squadron.



A Ram Command/Observation Post tank of D Battery, 23rd Field Regiment advancing near the Caen–Cintheaux highway on August 8, 1944, during Operation *Totalize*. The Ram C/OP tank was deployed with the 19th and 23rd Field Regiments in Normandy. (LAC PA-131376).

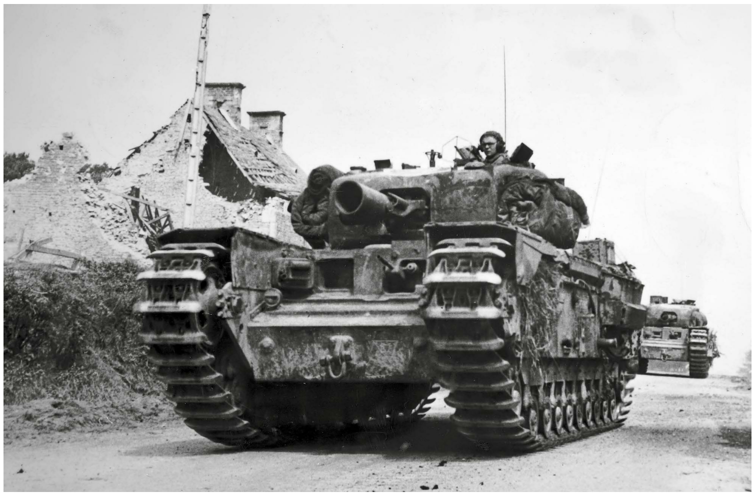
In Normandy, the Cromwell was most closely associated with the 7th Armoured Division, which was equipped primarily with this type. The Cromwell was faster than the Sherman, with a road speed up to 40mph. As a result, three other divisions used the Cromwell in their armored reconnaissance regiments instead of Stuarts, namely the Guards Armoured Division, 11th Armoured Division, and 1st Polish Armoured Division.

As in the case of the Sherman, a 17-pdr version was developed, the Challenger. Indeed, this tank pre-dated the Sherman 17-pdr. However, the size of the 17-pdr gun required that the chassis be enlarged by lengthening the hull, with a new and larger turret added. To limit weight growth, the turret frontal armor was reduced. This was not an entirely successful type and was built in very modest numbers, only about 200.

The Canadian-manufactured Ram cruiser tank was not used in Northwest Europe in the gun-tank role. A small number were deployed in Canadian SP artillery units as Command/Observation Posts (C/OP) on a scale of four per artillery regiment. In the late summer of 1944, a significant number of Ram tanks had their turrets removed and were used as improvised armored personnel carriers, dubbed the Kangaroo.

British infantry tanks

The only infantry tank in service in Normandy was the Churchill. These were intended mainly for the tank brigades that were assigned the infantry support mission. The most common Churchill versions in Normandy at the start of the campaign were the Churchill III and Churchill IV. A portion of these were still fitted with the 6-pdr, but a program had been under way since August 1943 to re-equip them with the British Ordnance 75mm gun as used on the Cromwell. The 6-pdr actually had superior antitank performance to the 75mm gun, even more so in the summer of 1944 as APDS (armor-piercing discarding-sabot) ammunition became available. However, its high explosive round was inferior to the 75mm gun, and high explosive firepower was more important in the infantry support role.



A column of Churchill AVREs of the 79th Armoured Division moves forward in Normandy. This version of the Churchill tank was armed with a 290mm Petard mortar that fired a 40lb “Dustbin” high explosive demolition charge.

D CHURCHILL MK IV, “FULHAM” AND CHURCHILL MK IV AVRE

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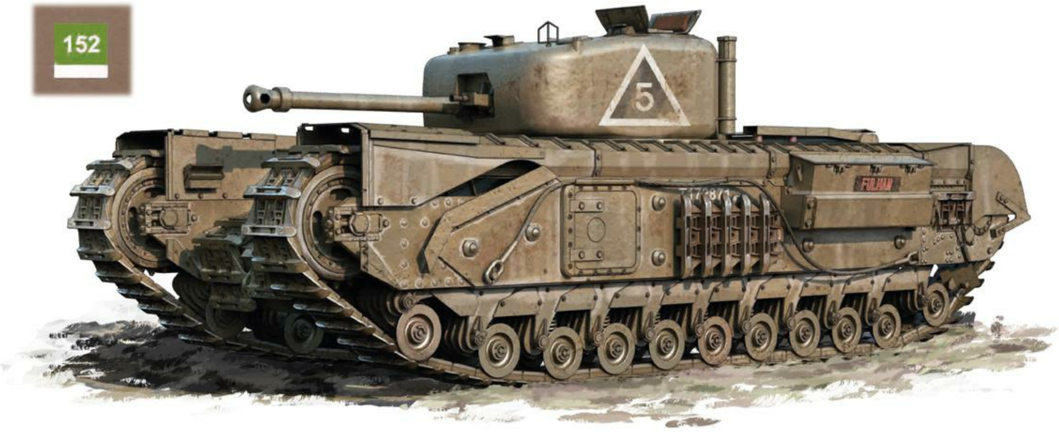

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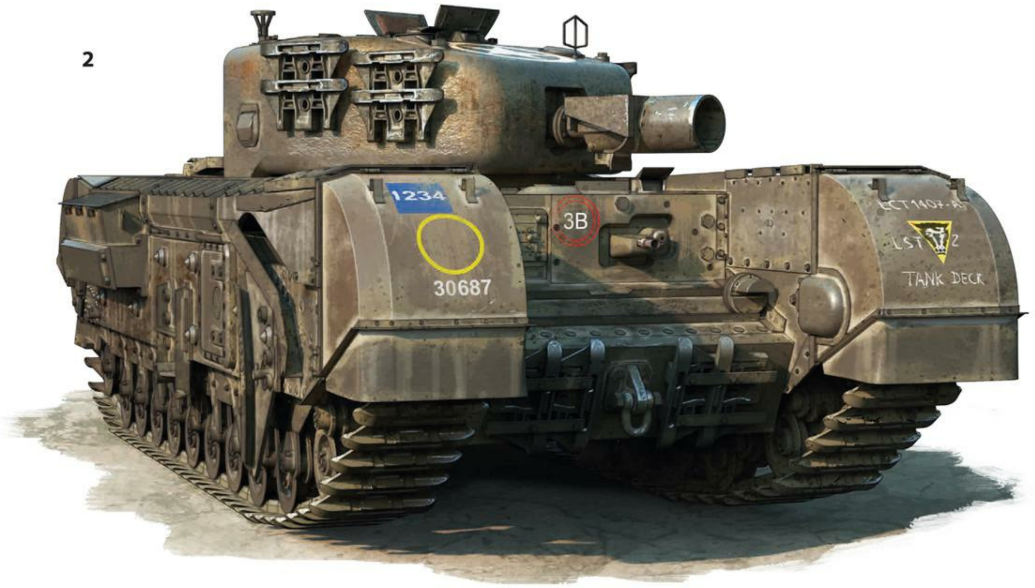


1. Churchill Mk IV, "Fulham", 5 Troop, A Squadron, 4th Battalion Grenadier Guards, 6th British Guards Armoured Brigade, Saint-Pierre-Tarentaine, August 1944

In April 1944, the British Army released ACI 533/44, which adopted SCC 15 (Standard Camouflage Colour 15) olive drab as the standard color for army equipment. The aim was to avoid the need to repaint Lend-Lease American equipment such as tanks. The instructions noted that tanks painted in the previous color, SCC 2 brown, should not be repainted unless necessary. As a result, British tanks in Normandy could be seen in either SCC 2 brown or SCC 15 olive drab. In this case, the Churchill was probably left in the original SCC 2 brown.

The markings on this tank are fairly standard, including a turret tactical sign for 5 Troop, A Squadron, with the triangle indicating the squadron and the number indicating the troop. In this case, it has been obscured by mud. The tank name is on the side, as is the census number. The spare track-links on the bow hide the AoS, which would have been a green square with white line below. The number 152 indicated the senior regiment.

2. Churchill Mk IV AVRE, 6th Assault Regiment, 1st Assault Brigade, 79th Armoured Division, Vaucelles, August 1944, Operation *Totalize*

This Churchill AVRE was probably repainted in SCC 15 olive drab as part of the modification process. It carries the usual assortment of markings on the hull front. Chalked on the right mudguard are the various D-Day ship assignments, starting with the identification of the tank deck on the LST and then identifying the LCT that landed the tank. The divisional insignia is evident on the left mudguard. On the right mudguard is the AoS for the regiment, a white 1234 on cobalt blue rectangle; 1233 being the 5th Assault Regiment and 1235 being the 42nd Assault Regiment. The symbol below is probably an incomplete bridging circle minus the expected weight number. The code 30687 is most likely the unit serial number associated with embarkation markings. Based on the number, the embarkation marking should consist of three colored bars (dark bronze green/red/dark bronze green) but this is not apparent on photo references, perhaps blending into the olive drab due to the dark colors. On the turret roof is the Allied recognition star in white, which had been adopted as the standard Allied air recognition marking by COSSAC (Chief of Staff Supreme Allied Command) in December 1943 and reiterated in Ops Memo 20.

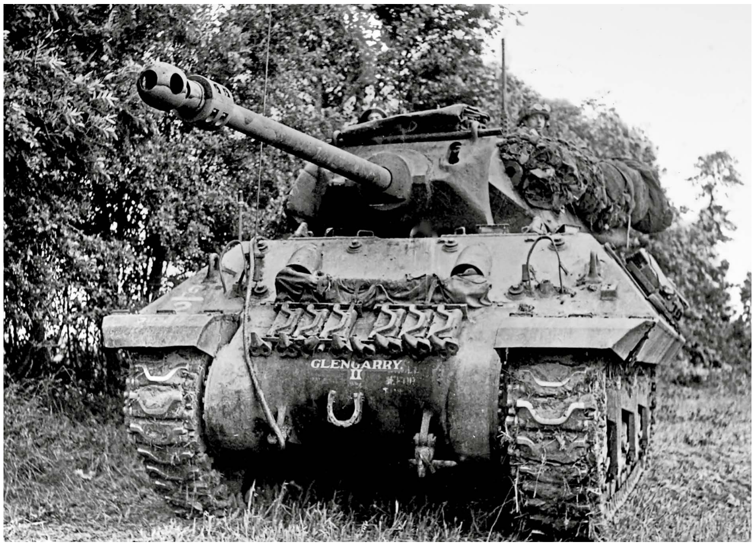
The Churchill VI was essentially like the Churchill IV, but had been manufactured from the outset with a 75mm gun. The new Churchill VII, sometimes dubbed the Heavy Churchill for its thicker armor, was a heavily modernized redesign, equipped from the outset with a 75mm gun. At the beginning of the Normandy campaign, it served primarily with 141 RAC. There was a close-support version of the Churchill IV in service in Normandy, the Churchill V armed with the 95mm howitzer. These were not numerous, constituting only about a tenth of Churchill strength in June 1944. Generally, there were two in each squadron.

There were a number of specialized Churchill types in service in Normandy, serving mainly with the 79th Armoured Division, including the Churchill Crocodile flamethrower tank and Churchill AVRE.

A Churchill IV of B Squadron, 147th RAC, 34th Tank Brigade undergoing repair east of the Orne on August 14, 1944. Behind it is a Churchill ARV Mk I and to the upper left is a Universal Carrier. The brigade took stiff losses on August 6–7 during the fighting with the 12.SS-Panzer-Division “Hitlerjugend” but secured the Grimbosq bridgehead over the River Orne in the process.

British tank destroyers

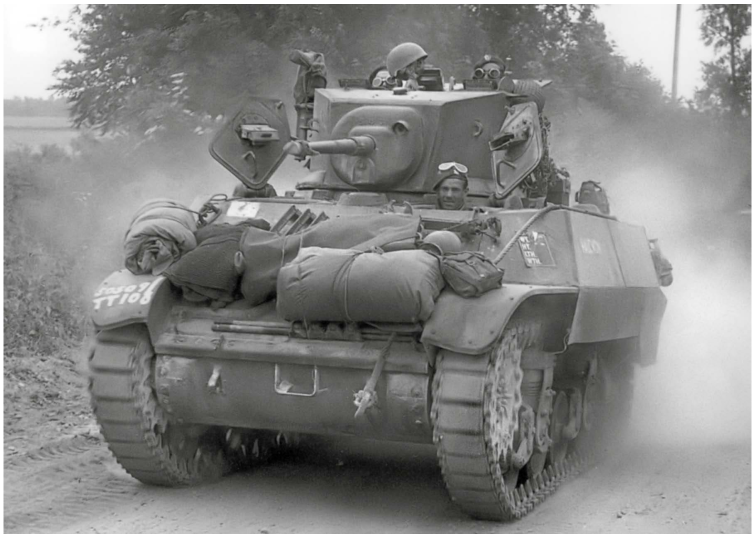
A thousand American M10 3in GMCs were ordered in 1943 as part of the Weeks-Somervell Agreement. A total of 1,128 vehicles were delivered in 1944. The M10 in British service was called the 3in SPM (self-propelled mount) M10 Mk I with the heavy wedge counterweight on the turret rear, and 3in SPM M10 Mk II with the later duckbill counterweight. By 1943, the British Army preferred the 17-pdr as its principal antitank weapon, and the majority of British M10s were converted to this weapon. Indeed, 520 of the M10 tank destroyers delivered in 1944 were shipped from the US without the 3in gun since the British Army had anticipated re-arming it with the 17-pdr. The conversions began in the spring of 1944 at the Royal Ordnance Factory in Leeds, and the first 98 were completed in May 1944. From May 1944 to April 1945, 1,127 M10s were converted by factories and depots, and a further 262 in tank troop workshops for a total of 1,389. They were variously designated as M10C or M10 17-pdr. The M10s were issued to the antitank regiments of the Royal Artillery and the armored divisions. Usually, two of the regiment's four batteries were equipped with SP guns, and two with towed guns. These batteries had three squadrons each, for a total of 24 M10s per regiment.



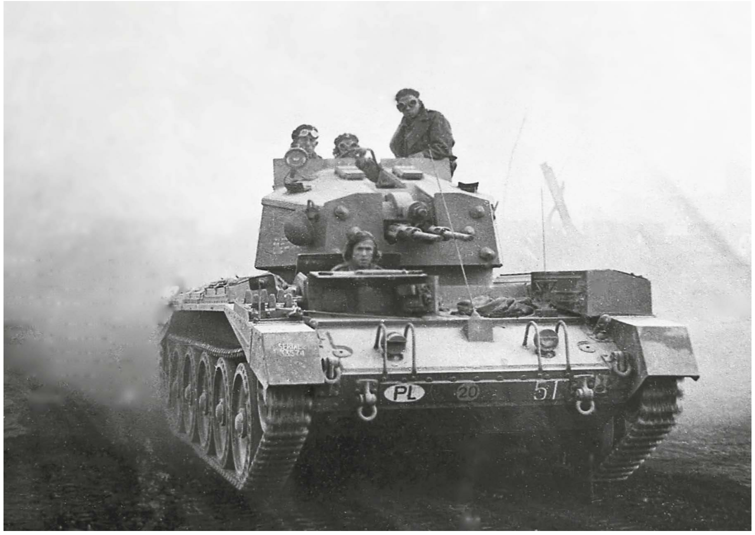
An M10C 17-pdr named "Glengarry II" of the 91st Antitank Regiment Royal Artillery (Argyll & Sutherland Highlanders) seen along the Norman hedgerows. The unit served with the British VIII Corps in Normandy.

British light tanks

The principal light tank in British service was the Stuart, serving in the reconnaissance role. Three versions were in use in Normandy. The Stuart III (M3A1) was the final version of the baseline M3 family, but fitted with an integrated fighting compartment, including a turret basket. This version was not entirely popular with British crews because of its cramped turret, and various modifications were made to improve its "fightability." The Stuart V (M3A3) had the same powertrain based on a Continental 7-cylinder radial engine, but introduced a new hull and enlarged turret with radio bustle. The Stuart VI (M5A1) was a parallel development to the M3A3 but had a different powertrain with twin Cadillac automobile engines connected to a Hydramatic automatic transmission. Priority for the Stuart VI was to the 4th Canadian Armoured Division and the 11th Armoured Division. The armored reconnaissance regiments of the infantry divisions used armored cars and light reconnaissance cars rather than light tanks.



A Stuart V of the 8th King’s Royal Irish Hussars, 7th Armoured Division, on June 15, 1944, two days after the disastrous fighting in Villers-Bocage



A Crusader AA III of the antiaircraft platoon of the 1.Pułk pancerny, 1.Dywizja pancerna (1st Armoured Regiment, Polish 1st Armoured Division) moving south of Caen in preparation for the attack towards Falaise in mid-August 1944. Although nominally responsible for air defense, the absence of the Luftwaffe over Normandy in August 1944 led to the use of these tanks for fire support against ground targets.

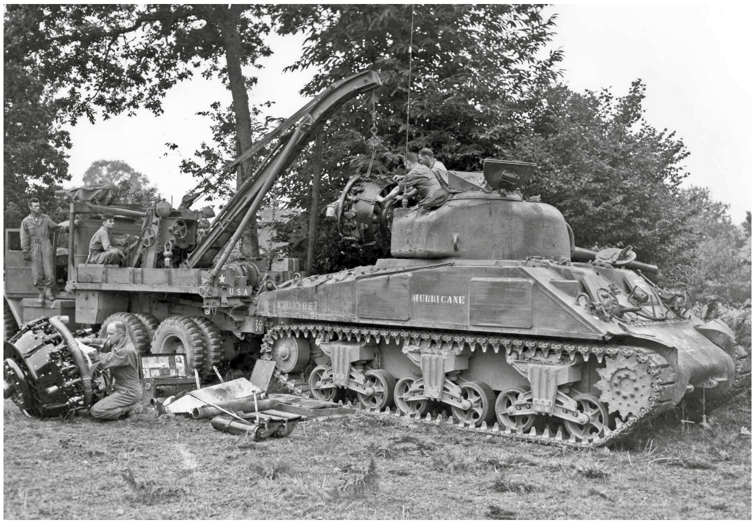
The other light tank to see limited service in Normandy was the Tetrarch. This was used as an airborne tank, delivered by Hamilcar glider. Eighteen airlanded in Normandy with the 6th Airborne Armoured Reconnaissance Regiment of the 6th Airborne Division. They were not ideal for prolonged combat and were eventually supplemented with Cromwell tanks.

US TANKS AND AFVS IN NORMANDY

US tanks and AFVs in Normandy were much more standardized than in the British case. The principal tank type was the M4 medium tank. This family of tanks was dubbed the Sherman tank by Britain, but this name was not widely used in the US Army in World War II.

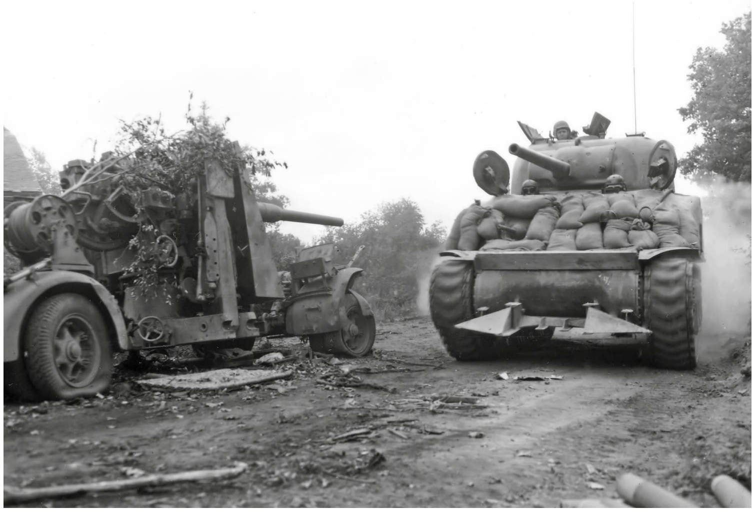
Until late in the summer of 1944, nearly all US medium tanks in the ETO were the M4 and M4A1, powered by a Continental radial engine. From a maintenance standpoint they were identical, but differed from each other in the construction of the upper hull. These types were the original production versions of the M4 series since 1942.

In the summer of 1943, the US Army implemented a set of fleet-wide upgrades to all M4 medium tanks in the ETO manufactured before December 15, 1943, variously called the “Quick-Fix” or “Blitz” program. This included a wide range of small mechanical changes as well as the standardization of several urgent upgrades. One of the most obvious of these was the decision to fit all M4 tanks with the M34A1 gun mount, based on a British recommendation. This included the wider gun mantlet as well as a direct telescopic sight to supplement the existing periscopic gunner’s sight. In addition, tanks were fitted with appliqué armor on the hull sides to protect the sponson ammunition. Appliqué armor was also added to the right front of the turret due to a weakness in the casting there.



A 10-ton wrecker lifts the Continental R-975 radial engine from the M4 named “Hurricane” of H Company, 66th Armored, 2nd Armored Division near Le Teilleul on August 16, 1944. Its tactical numbers, H-2, were overpainted prior to Operation *Cobra* when the black camouflage pattern was applied.

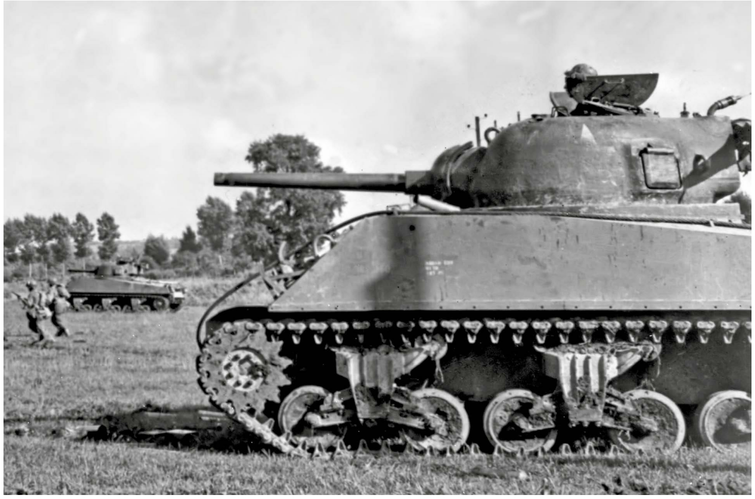
By the summer of 1943, Ordnance had developed a package of additional improvements for incorporation into an improved generation of tanks known simply as “Medium Tank M4 Series (ultimate design).” The new “Wet” ammunition stowage moved most of the ammunition stowage to the floor to reduce the likelihood that the ammunition would be hit by enemy projectiles. The new ammunition bins were protected by thin armor to lower the chance of penetration by shell fragments and the tubes were surrounded by liquid to reduce the chance that the ammunition propellant would be ignited by hot spall. The hull was redesigned, with larger hatches in the front to make it easier for the driver and bow gunner to escape as well as to simplify production.



An M4 medium tank fitted with a T2 Douglas hedgerow cutter, part of Task Force X, Combat Command A, 3rd Armored Division, passes an abandoned 8.8cm Flak gun near Lougé-sur-Maire on August 17, 1944. This is one of the new composite-hull M4 medium tanks with the large hatches and wet stowage, and so probably a replacement tank. The 3rd Armored Division fought a series of costly engagements with Panzergruppe Eberbach from the Rânes area on August 15 to Fromentel on August 17.

On January 11, 1943, US Army Ground Forces adopted a new policy that preference for US tank units in the future would be the M4A3, M4A1, and M4 in that order. Production of the improved M4A3 (W) began in February 1944 at the Chrysler Tank Arsenal at Grand Blanc, but this type did not begin to appear until the very end of the Normandy campaign. The awkward and non-standard designations with the "W" suffix were seldom used in the US Army, except by Ordnance.

The other major change in the M4 series in 1943 was the development of a version with the new 76mm gun. The first of these to enter production in January 1944 was the M4A1, which had the new hull and wet stowage and so was designated by Ordnance as M4A1 (76mm) W. The first batch of 130 M4A1 (76mm) arrived in Britain on April 10, 1944. A conference was held at FUSA headquarters on April 20 to discuss how to distribute the new tanks. None of the units wanted the new tanks, since the only advantage of the new 76mm gun was better antitank performance, while at the same time, it had an inferior high explosive projectile compared to the existing 75mm gun. Since the antitank performance of the 75mm gun was viewed as being adequate, this was a serious deficit for the 76mm gun since high explosive rounds constituted the majority of ammunition expended in combat.

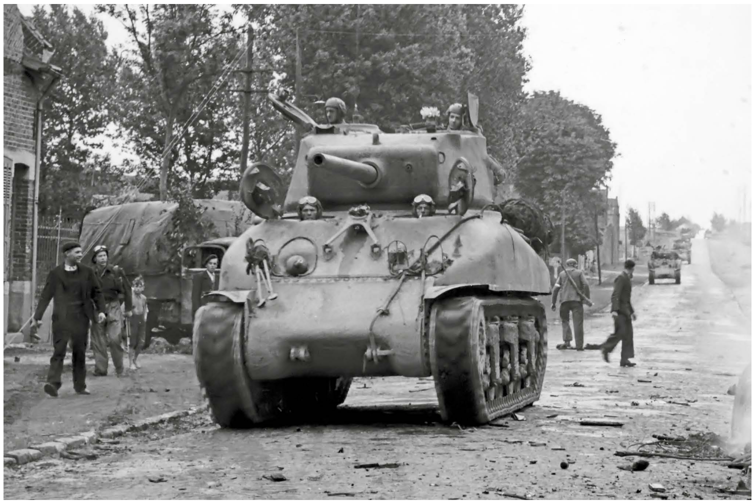


An M4A3 of the 737th Tank Battalion near Dombasle on September 15, 1944 while supporting the 35th Infantry Division. This is one of the new M4A3 tanks with the improved hull with wet ammunition stowage, evident from the angle of the hull glacis plate.

As a result, no M4A1 (76mm) tanks landed in Normandy in June 1944. Following encounters with the German Panther tank in July 1944, there was much greater demand for better antitank firepower. A total of 102 were evenly split between the 2nd and 3rd Armored Divisions in time to take part in Operation *Cobra* in late July, and the remaining 28 were split up in small batches for some of the separate tank battalions of the FUSA. The 76mm turret was also adapted to the new M4A3 as the M4A3 (76mm) W and entered production at the Detroit Tank Arsenal in March 1944. The first of these arrived in the ETO in early August 1944 and began being issued shortly afterwards.

A variety of specialized tanks for combat engineer tasks began appearing in the summer of 1944. The most important of these was the M1 tank dozer kit that could be fitted to any of the standard Sherman tanks. Production started in April 1944, so there were shortages through the Normandy campaign. The plan was to issue six to each tank battalion. The T1E3 Aunt Jemima mine exploder tank entered production in March 1944, with deliveries in May 1944. This device could be fitted to any standard M4 series tank, but did not see widespread use until September 1944. A small number of British Sherman Flail tanks ordered for the D-Day landings were finally delivered in mid-July 1944 and first used during the fighting around St. Lô.

Besides the standard gun-tank version of the Sherman, the M4 (105mm) assault gun began to appear in Normandy. This resembled a normal M4 tank but was armed with a 105mm howitzer. They were intended to provide additional high explosive firepower for the tank battalions. The plan was to issue six per battalion, with three in a headquarters platoon and one in each medium tank company headquarters.



One of the new M4A1 (76mm) tanks of D Company, 66th Armored Regiment, 2nd Armored Division in Aubencheul-au-Bac, north of Cambrai, on September 2, 1944 during the approach to the Belgian border.

Due to the failure of the M7 light tank program, the standard US Army light tank in Normandy was the old M5A1. Although well beyond its prime, the M5A1 remained the only US Army light tank to see service in the ETO until the new M24 light tank began to arrive in December 1944. Each US Army tank battalion had a company of M5A1 light tanks. The M5A1 was also used extensively in mechanized cavalry squadrons.

Six M4 (105mm) assault guns of an unidentified tank battalion conduct a fire mission on July 13, 1944. Each tank battalion was authorized three of these assault guns in a headquarters platoon, plus one each in the three medium tank companies. They were often concentrated into an ad hoc artillery unit as seen here. In mid-July, there were 48 of these in service in First US Army in eight separate tank battalions.

The assault gun version of the M5A1 light tank was the M8 75mm HMC. This used a modified M5A1 hull with an enlarged, open-top turret fitted with a short 75mm howitzer. It was deployed primarily in mechanized cavalry squadrons, though it remained in use in the 2nd and 3rd Armored Divisions owing to their retention of the 1942 TO&E.

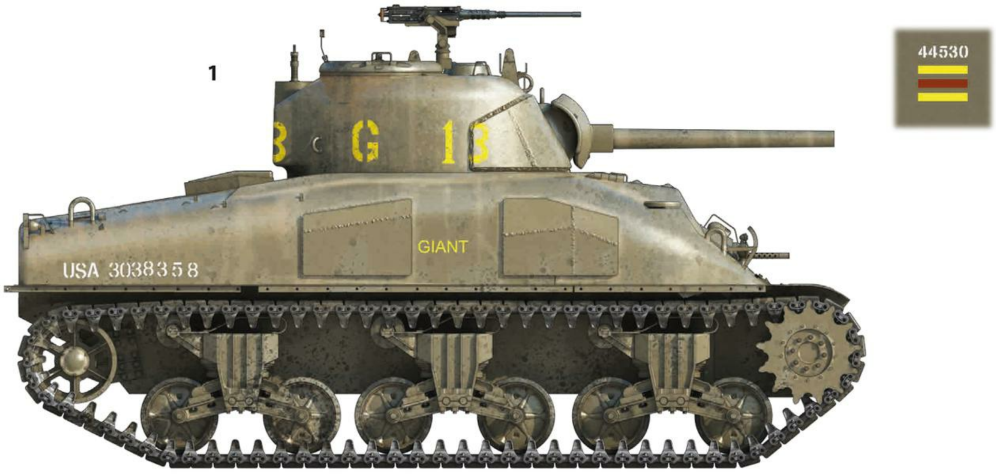
BATTLE ANALYSIS

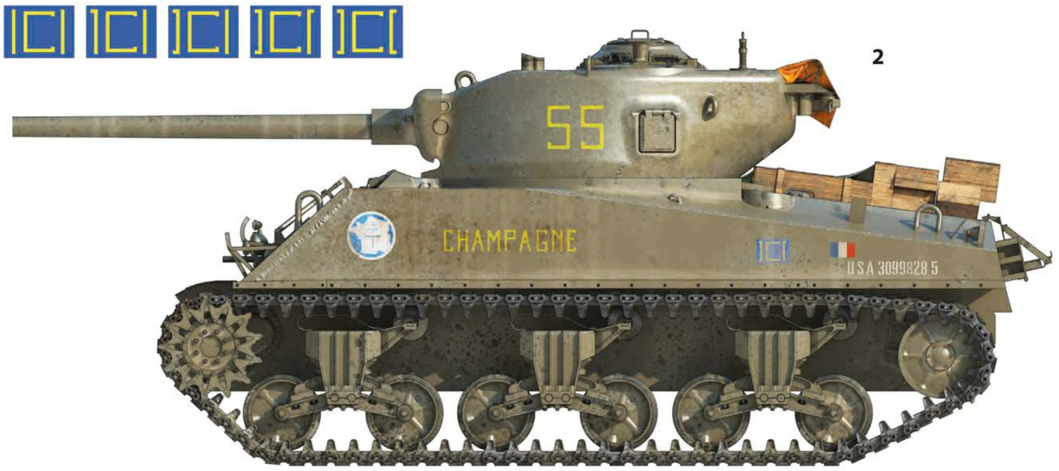
Organizational and doctrinal lessons

The British Army recognized the shortcomings in tank-infantry cooperation in Normandy. Many units began to take the initiative to develop more effective tactics by August 1944. Some units proved more adaptable than others, with the 11th Armoured Division standing out.

In the wake of the fighting in the bocage country during Operation *Bluecoat* in August 1944, a conference was held on August 25 to discuss possible solutions. As a result, in early September, the RAC Branch of 21st Army Group issued a set of notes regarding tank-infantry cooperation. This envisioned the employment of tanks in support of infantry in close terrain on a scale of a regiment per infantry brigade, a squadron per infantry battalion, and a troop per infantry company. The instructions set out in detail many of the lessons learned from the fighting. These tactical corrections would prove to be well timed, since the later campaigns in Northwest Europe were very different from Normandy, with very little large-scale tank-vs-tank fighting but a great deal of infantry-tank fighting in close terrain.

E M4A1 AND M4A3 (76MM)





1. M4A1, G Company, 66th Armored Regiment, 2nd Armored Division, June 1944

While still in training in the UK, the 2nd Armored Division painted large tactical numbers on the side and rear of its tank turrets in chrome yellow that indicated the company and individual tank number. In this case, it was G-13 with the tank named "GIANT" in keeping with the usual practice of using names starting in the company letter. The bumper codes for this tank were 2^66^ G-13 and the POM marking on the right side of the transmission cover were 44530 with yellow/brown/yellow barcode.

2. M4A3 (76mm), 12e RCA, 2e Division Blindée, Paris, August 1944

The 2e Division Blindée had an elaborate set of tactical markings. The divisional insignia was a circular blue emblem edged in white showing a map of France with the Cross of Lorraine superimposed. The regiments and their sub-units were identified by a complex set of symbols in a blue square. The 12e Regiment des Chasseurs d'Afrique used the letter "C" in the center, with two vertical lines on either side. The escadron were identified by the location of the pips on the outside of the vertical bars, as shown on the illustration. “Champagne” (#55) was originally an M4A2 of the 3e Peloton, 3e Escadron of platoon leader Asp Nouveau destroyed on August 13 during the fighting towards Paris. It was replaced by a new M4A3 (76mm) from US stocks, and so one of the first of the new type in combat. It was knocked out on September 13, 1944 during the fighting near Ville-sur-Illon in Lorraine, and the tank remains there as a war memorial.

A French civilian pours a glass of wine for the crew of an M5A1 light tank of D Company, 8th Tank Battalion, 4th Armored Division in Coutances on July 29, 1944 during the breakout from Normandy.

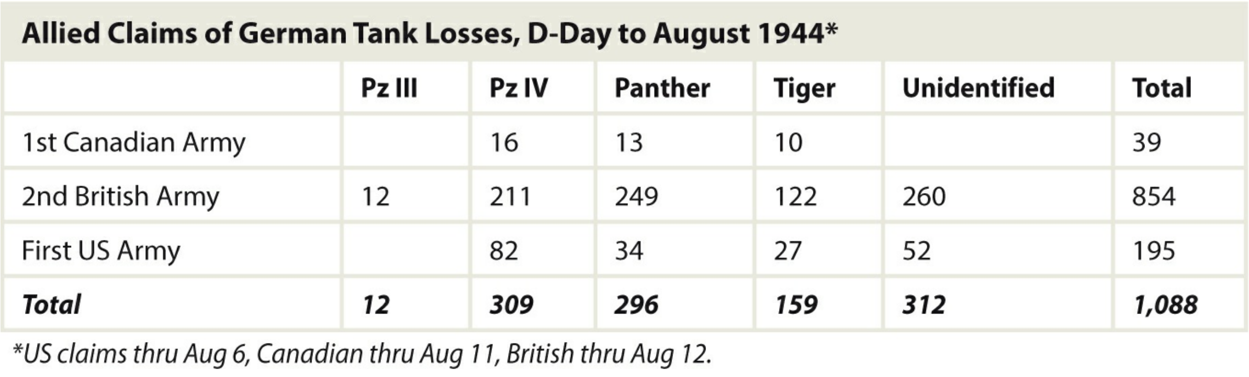
An M8 75mm HMC assault gun of the Reconnaissance Company, 33rd Armored Regiment, 3rd Armored Division in Montreuil on July 26, 1944 during the Operation *Cobra* breakout. There were three of these in the regimental recon company under the older 1942 “heavy” tables of organization and equipment, but they were not found in the armored divisions that switched to the 1943 TO&E.

The US Army did not suffer as much doctrinal distress as did the British and Canadian armies in Normandy. The fighting in the bocage was an unpleasant surprise, but adaptations seemed to work by the time that St Lô was finally captured. The overriding US Army lesson from the Normandy fighting was that tank battalions had to be attached to infantry divisions for any offensive operation. Furthermore, it was best to use the same tank battalion with the same infantry division once they had worked out their tactical solutions. Tank battalion commanders often complained that infantry commanders acted as though tanks were invulnerable. They would send the tank companies on hazardous missions with the expectation that another tank battalion would be provided if the first tank battalion suffered heavy losses. In the summer of 1944, there were never enough tank battalions to issue them to each infantry battalion, so infantry commanders gradually realized that tank battalions had to be husbanded for missions where they could do the most good.

The armored division commanders were generally satisfied with the combined arms balance of the 1943 TO&E. As expected, the two heavy divisions on the 1942 TO&E were too weak in infantry. The solution was to attach an infantry regiment from a neighboring division for major offensives, as was done during Operation *Cobra*.

Technical lessons

The overwhelming technical lesson from the Normandy campaign was the inferiority of the Sherman against the heavier German tanks such as the Panther and Tiger. This was most painfully felt in the British/Canadian units, since they bore the brunt of the tank-vs-tank fighting, as is evident from the accompanying chart.

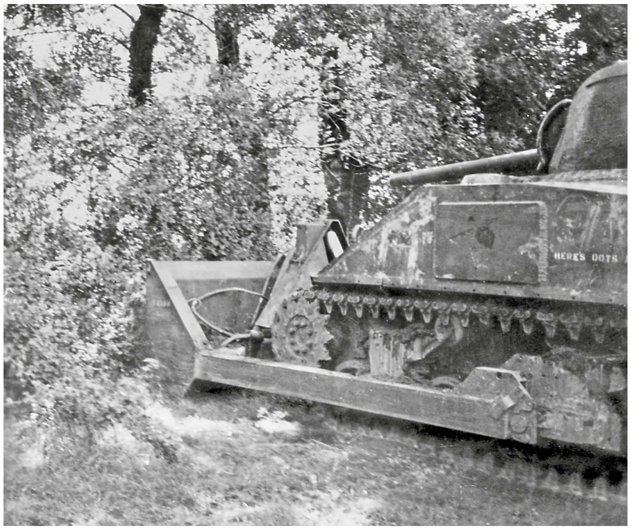


Allied Claims of German Tank Losses, D-Day to August 1944*

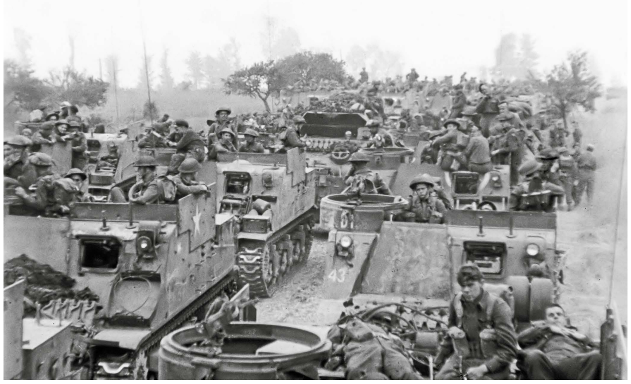
	Pz III	Pz IV	Panther	Tiger	Unidentified	Total
1st Canadian Army		16	13	10		39
2nd British Army	12	211	249	122	260	854
First US Army		82	34	27	52	195
Total	***12***	***309***	***296***	***159***	***312***	***1,088***

**US claims thru Aug 6, Canadian thru Aug 11, British thru Aug 12.*

The Sherman's 75mm gun could not penetrate the frontal armor of the Panther or Tiger, even at close ranges. It could penetrate the side armor of the turret from 1,600yds or the hull from 400yds. According to a postwar British report, typical tank-vs-tank engagement ranges were 1,200yds in the open country around Caen and about 400yds in the bocage country further west.[2]



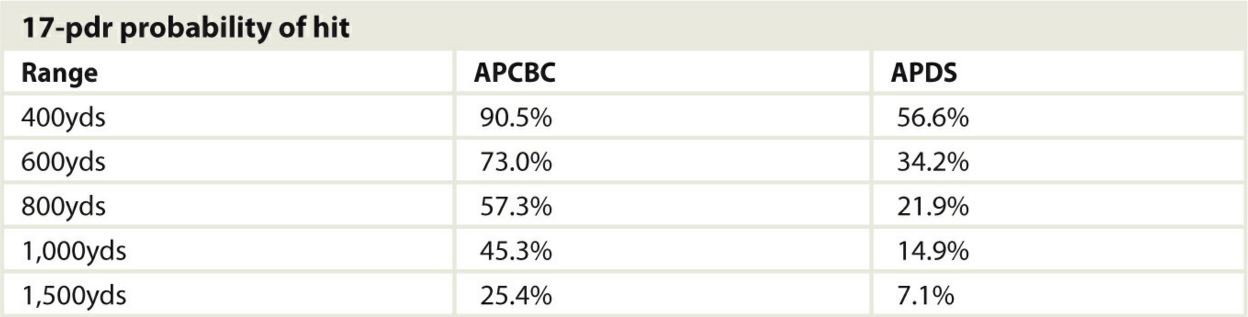
One of the more versatile innovations to see its debut in Normandy was the M1 tank dozer. This dozer attachment could be fit to nearly all versions of the Sherman tank and used for a variety of combat engineering tasks while under fire. This is an example from the 23rd Armored Engineer Battalion, 3rd Armored Division on July 13, 1944 attempting to cut through dense bocage. Although the dozer was effective in this role, there were too few in service since production had begun only in mid-April 1944.



To facilitate tank-infantry cooperation, redundant Priest 105mm self-propelled howitzers were hastily converted to improvised Kangaroo armored personnel carriers for Operation *Totalize*. The opening for the howitzer was plated over with two layers of mild steel, with the gap in between filled with sand. This shows the troops of the 4th Infantry Brigade, 2nd Canadian Division loaded up on their Kangaroos on the afternoon of August 7, 1944 before the attack the following day. The Kangaroos still show the markings of their original owners, the 13th Field Regiment RCA. (LAC PA-129172)

In frontal confrontations with the heavier German tanks, Allied tank crews would often engage them with high explosive rounds, which could sometimes discourage less experienced German crews. US tank crews developed expedients such as the use of the white phosphorus smoke round. Aside from blinding the German crew, the toxic fumes were often sucked into the crew compartment by the fans, sometimes leading to the panzer being abandoned. However, these expedients were no substitute for an adequate gun.

The 17-pdr gun on the Sherman Firefly using the standard APCBC (Armor-piercing, capped with ballistic cap) ammunition could penetrate the gun mantlet of the Panther at about 1,500yds, but it could not penetrate the hull glacis armor. Although the 17-pdr was a distinct improvement over the 75mm gun in tank fighting, British tankers were still disappointed with its performance. A XXX Corps report noted, “The gun is criticized for not being big enough and bounces off the Tiger at 1,500 yards. As the Hun tends to fight at 2,000 yards, our crews have a feeling of being outgunned. There is strong demand for a Sabot ammunition.” The improved 17-pdr APDS began to arrive in France in late August 1944 after much of the heaviest tank-vs-tank fighting had concluded. It offered a significant increase in penetration power, enabling the 17-pdr to penetrate virtually any German tank frontally at ranges as great as 2,700yds. But this sabot round suffered from dispersion problems at longer ranges, probably due to erratic separation of the sabot petals from the penetrator after leaving the barrel.



17-pdr probability of hit

Range	APCBC	APDS
400yds	90.5%	56.6%
600yds	73.0%	34.2%
800yds	57.3%	21.9%
1,000yds	45.3%	14.9%
1,500yds	25.4%	7.1%

Principal Allied Tank Guns, 1939–45

Caliber	75mm	76mm	17-pdr
Origin	US	US	UK
Tube length	L/40	L/52	L/55
Armor-piercing projectile	M61	M62A1	Mk 9/T
Type	APCBC	APCBC	APCBC
Initial muzzle velocity (m/s)	617	792	884
Projectile weight (kg)	6.78	7.0	7.7
Propellant weight (kg)	0.98	1.64	3.7
Penetration (mm; @500m, 30 degrees)	62–72	92–96	140
Armor-piercing projectile (high velocity)	n/a	T4 (M93)	Mk 1/T
Type		HVAP	APDS
Initial muzzle velocity (m/s)		1,036	1,121
Projectile weight (kg)		4.3	3.5
Penetration (mm; @500m, 30 degrees)		137	186
High explosive projectile	M48	M42A1	Mk 2
Projectile weight (kg)	6.7	5.8	6.1
Explosive fill (g)	665	390	500

F WITTMANN’S FOES

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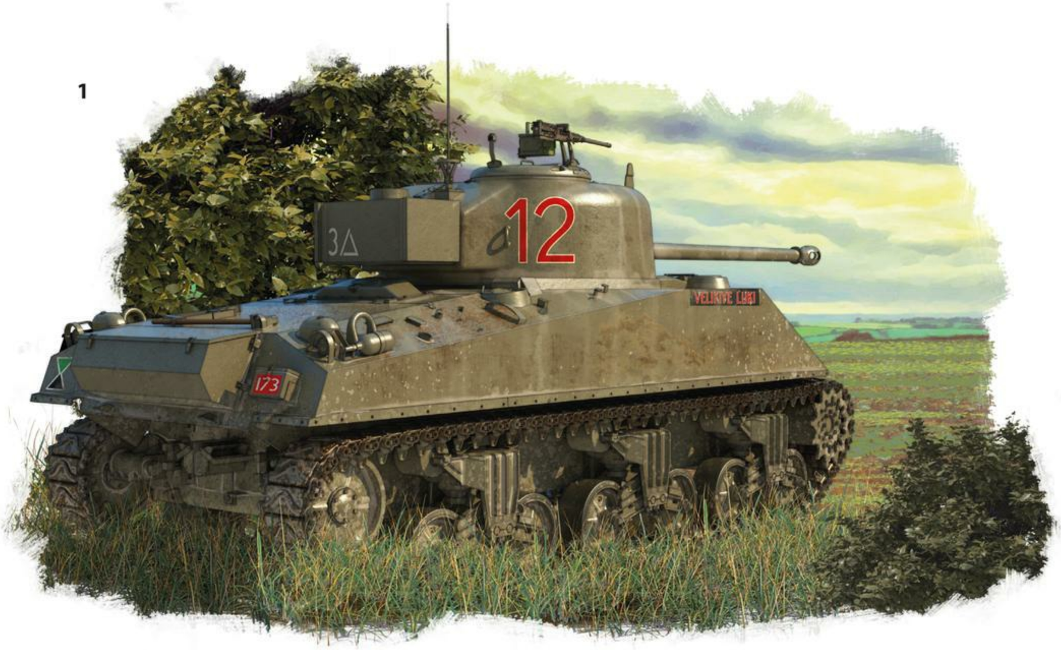

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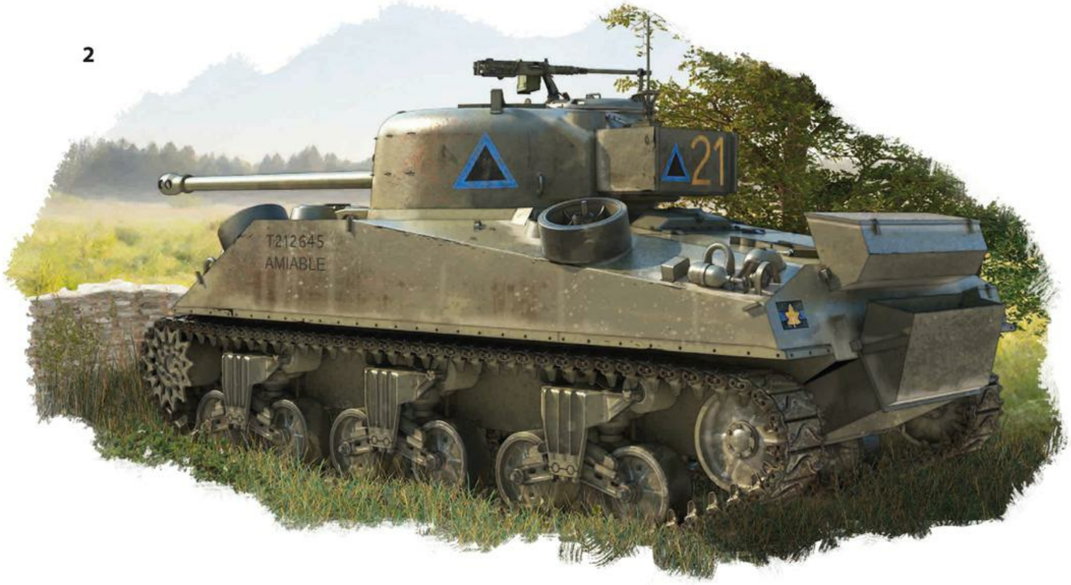

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As in the case of “Who shot down the Red Baron?”, there is considerable controversy over who killed the “Black Baron,” Tiger ace Michael Wittmann, on August 8, 1944. The problem is that both a British and a Canadian tank unit were in the vicinity of the spot near Route Nationale (RN) 158 to the southwest of St Aignan de Cramesnil when a column of Tiger tanks of s.SS-Pz.Abt. 101 were knocked out.

1. Sherman VC, 3 Troop, A Squadron, Northamptonshire Yeomanry, 33rd Armoured Brigade

The British candidate for the prize goes to a Sherman VC initially commanded in the engagement by Sgt Gordon and subsequently by the troop commander, Lt James, after Gordon was wounded shortly after the first Tiger was hit. This incident is most often associated with Trooper Joe Ekins, who served as the gunner on the tank during the entire engagement. It was named “Velikiye Luki” after the Russian town, and other tanks in the troop used Russian town names such as “Vladimir” and “Vladivostok.” This troop was located in woods immediately south of St Aignan de Cramesnil and to the east of RN 178. “Velikiye Luki” is generally credited with knocking out three Tiger tanks from Wittmann’s column that day. Markings information about this tank was first detailed in an article in *Military Illustrated* magazine in February 1994.

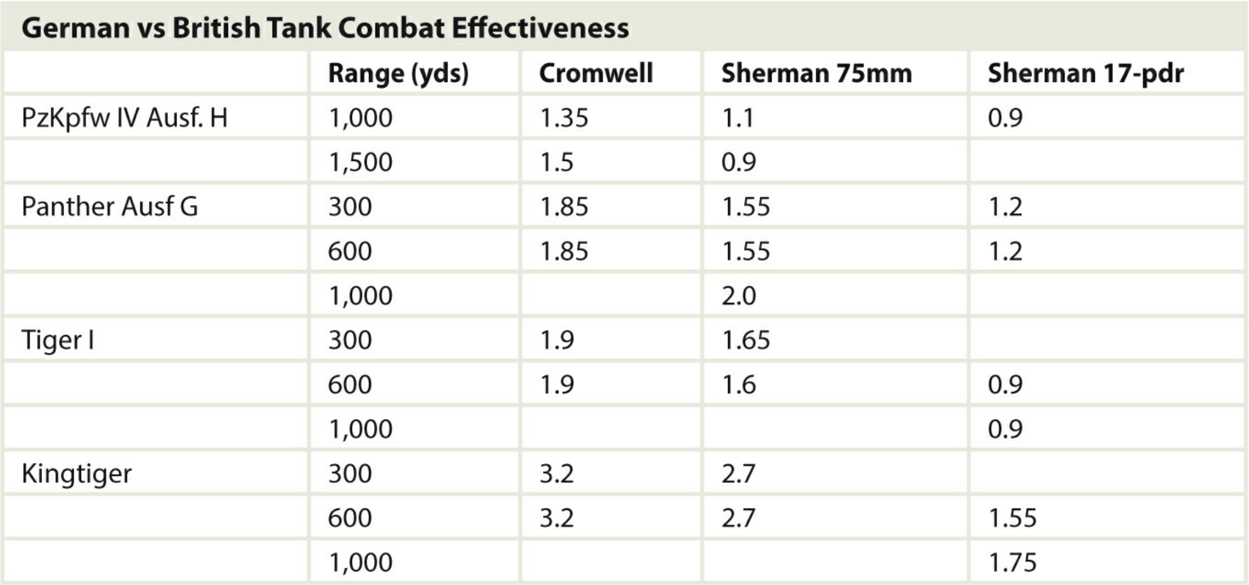
2. Sherman VC, A Squadron, 27th Armoured Regiment (Sherbrooke Fusiliers), 2nd Canadian Armoured Brigade

The Canadian contender was from A Squadron, 27th Armoured Regiment (Sherbrooke Fusiliers), 2nd Canadian Armoured Brigade, located in the vicinity of Gaumesnil on the west side of RN 178. While 1 Troop under Lt T. Garry Gould provided overwatch cover, 2 and 3 Troop, along with the squadron commander, Maj Sydney Radley-Waters, took up positions behind the damaged wall of a chateau along the road. There were eight tanks in total: six 75mm Sherman IIIs and a pair of Sherman VC Fireflies commanded by the two troop leaders. According to Canadian accounts, after Ekins’ Firefly had knocked out the three leading Tiger tanks, they engaged the trailing Tigers and other German vehicles, including Wittmann’s 007. At least one Canadian account credits the hit on Wittmann’s Tiger to troop leader Lt J. E. “Bill” Logan, who was killed four days later on August 12. The squadron’s records were lost later that day when their command half-track was hit by mistake in an American fighter attack. As a result, precise details of this action cannot be determined and the depiction here is based on the photos of other Sherbrooke Fusiliers’ tanks. Logan was troop leader of either 2 or 3 Troop, so the markings on the rear radio box would have been either 21 or 31. Neither the name nor census number of Logan’s tank are known, and those depicted here are entirely conjectural and intended only to show the style and location typical of the Sherbrooke Fusiliers. The formation sign on the hull rear is that of the 2nd Canadian Armoured Brigade, a yellow maple leaf on a black square, horizontally bisected by a blue stripe; on the opposite side would be a red square with white 52, indicating the junior regiment of the brigade.

The US 76mm gun could only penetrate the Panther mantlet at 200–300 yards, and was incapable of penetrating the hull glacis plate. A shipment of 2,000 rounds of the experimental T4 76mm HVAP (high-velocity armor-piercing) ammunition was airlifted from the US to France in August 1944. This new projectile gave the 76mm gun performance similar to the 17-pdr firing the standard APCBC round, but this type of ammunition remained scarce since it depended on a tungsten-carbide core.

A patrol of M5A1 light tanks of B Company, 1/33rd Armored, 3rd Armored Division near Marigny on July 26 during the Operation *Cobra* breakout. The tanks are fitted with the T1 Rhino hedgerow cutter, designed by Sgt Curtis Culin of the 102nd Cavalry Reconnaissance Squadron.

In contrast to the Panther and Tiger, the Sherman was not heavily armored. It could be knocked out by all of the standard German 75mm and 88mm tank guns at any normal combat range. After the war, the British Army attempted to assess the relative technical effectiveness of German and British tanks. The results are summarized below. The numerical rating indicates the effectiveness ratio of the specified German tank versus the specified British tank, with a rating of 1.0 indicating they were equivalent. So in the first case of the PzKpfw IV Ausf H in a duel at 1,000 yards, it was 1.35 times more effective than the Cromwell but only 90 percent as effective as a Sherman Firefly.



German vs British Tank Combat Effectiveness

	Range (yds)	Cromwell	Sherman 75mm	Sherman 17-pdr
PzKpfw IV Ausf. H	1,000	1.35	1.1	0.9
	1,500	1.5	0.9	
Panther Ausf G	300	1.85	1.55	1.2
	600	1.85	1.55	1.2
	1,000		2.0	
Tiger I	300	1.9	1.65	
	600	1.9	1.6	0.9
	1,000			0.9
Kingtiger	300	3.2	2.7	
	600	3.2	2.7	1.55
	1,000			1.75

E. Benn & R. Shephard, *Tank Effectiveness: A Comparison of the Theoretical Measure with Observed Battle Performance* (AORG Report No. 6/52, 1952)

Tank-vs-tank fighting was not solely dependent on technical factors. It often depended on the relative skills of the crews and the situation. The old adage about tank fighting still held true: who sees first, fires first, and who hits first usually wins. The Germans usually had an advantage in this respect, since they were often in a static defensive posture and able to spot advancing British tanks first during the many British armored offensive operations. A British study cited earlier, AORG Memo C.6, indicated that in Normandy, the side that fired first was successful on average 77 percent of the time. This figure was quite variable, with better or poorer results depending on the number of British tanks vs panzers.

The Germans were also vulnerable when conducting hasty counterattacks or when staging their infrequent offensive operations. Although much criticism has been directed against the British Army for the failure of many of its armored operations, it should be noted that the German Army was unable to conduct any successful panzer offensives in Normandy. Attempts to crush the Normandy bridgehead using panzer divisions in the first weeks of the campaign were unsuccessful and costly.[3] Divisional-sized attacks. such as the one by Panzer Lehr Division near Le Désert on July 11, were a costly flop.[4] The only large-scale German panzer offensive, Operation *Lüttich* in August 1944, was stopped by US infantry in the bocage country near Mortain, with heavy German losses.[5]

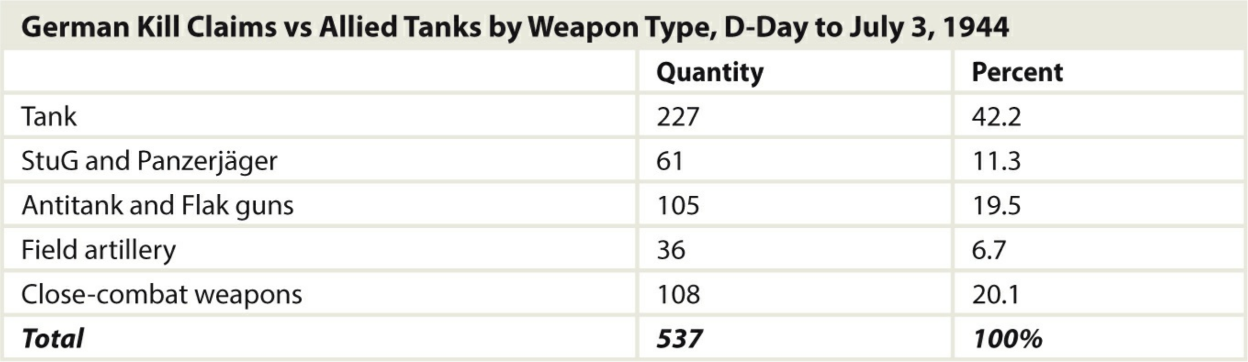
“Blitz,” a Sherman VC of B Squadron, Canadian 27th Armoured Regiment (Sherbrooke Fusiliers), knocked out in the fields between Authie and Abaye d’Ardenne near Buron on June 7, 1944 in a savage tank duel with II./SS-Panzer-Regiment.12.

Tank casualties

During pre-invasion planning, the British Army expected to suffer about 25 percent tank casualties per month, based on previous battlefield experience. Curiously, the US Army expected only about 7 percent per month, based on experiences in 1943–44 in the Mediterranean, where tank fighting was not particularly central to operations. These assessments included both losses due to enemy action and mechanical breakdowns.

Part of the problem in assessing tank casualties stems from the fact that a tank knocked out in combat may be recoverable and repairable afterwards. For example, after the first two weeks of fighting through June 23, the 2nd British Army had suffered 286 tank casualties out of 1,019 capital tanks, or 28 percent. Of these 286 tanks, 188 were total losses, while the rest were repairable. So the total losses were actually 18 percent. An assessment by the RAC in early September concluded that the pre-invasion plan for 25 percent tank replacements per month was reasonably accurate and should be maintained afterwards.

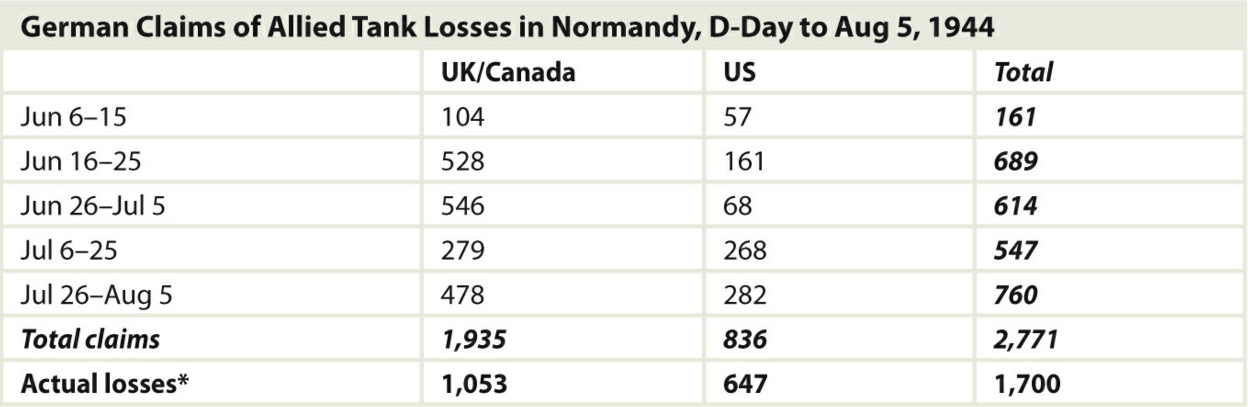
The sources of Allied tank casualties was difficult to assess, since it was often impossible to determine the source of enemy gunfire, whether from a tank, assault gun, or towed antitank gun. A German assessment suggests that nearly three-quarters of the Allied losses were due to gunfire. Mines are not listed, since the Wehrmacht had no means to assess such losses. However, British reports indicate that mine losses in Normandy were lower than expected compared to the experience in North Africa (15 percent of casualties), Sicily (25 percent) and Italy (22 percent).



German Kill Claims vs Allied Tanks by Weapon Type, D-Day to July 3, 1944

	Quantity	**Percent**
Tank	227	42.2
StuG and Panzerjäger	61	11.3
Antitank and Flak guns	105	19.5
Field artillery	36	6.7
Close-combat weapons	108	20.1
Total	***537***	***100%***

The Wehrmacht believed that the British/Canadian forces had suffered about 70 percent of the Allied tank casualties, as the accompanying chart details. As will be noted, the Wehrmacht kill claims were significantly higher than actual losses, a common problem in these sorts of assessments.



German Claims of Allied Tank Losses in Normandy, D-Day to Aug 5, 1944

	UK/Canada	**US**	***Total***
Jun 6–15	104	57	***161***
Jun 16–25	528	161	***689***
Jun 26–Jul 5	546	68	***614***
Jul 6–25	279	268	***547***
Jul 26–Aug 5	478	282	***760***
Total claims	***1,935***	***836***	***2,771***
Actual losses*	**1,053**	**647**	**1,700**

**Actual figure is based on British/US records*

British Tank/AFV Wastage, June 6–August 5, 1944*

Type	Gross	Recoverable	Net loss
Sherman I/II	98	21	77
Sherman III	156	27	129
Sherman V	358	43	315
Sherman V RAOP	19	3	16
Sherman IC/VC (17-pdr)	86	7	79
Sherman Crab	18	0	18
Cromwell IV/V/VII	178	8	170
Cromwell VI	15	0	15
Challenger	1	0	1
Stuart III/V/VI	79	4	75

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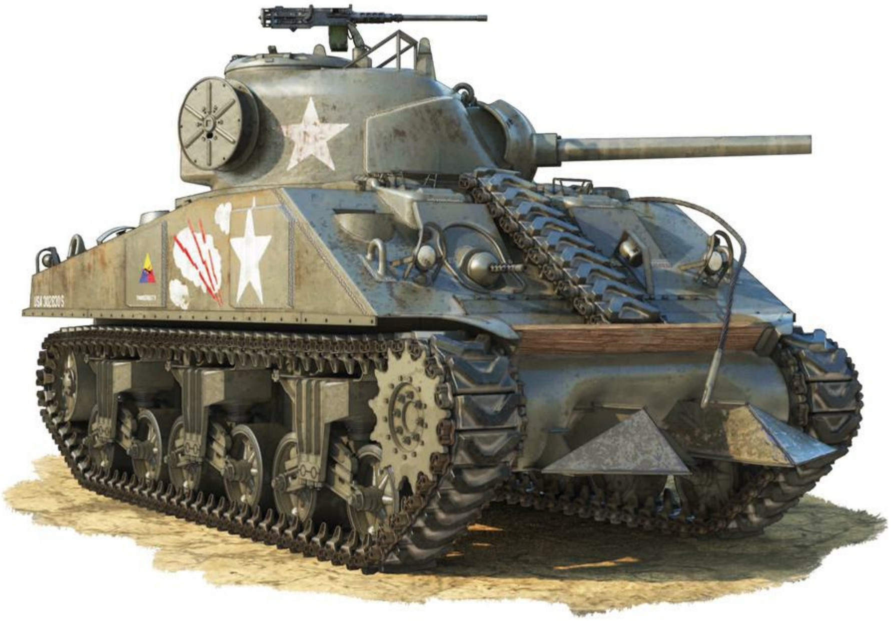
M4 MEDIUM TANK AND M4A1 (76MM)

1



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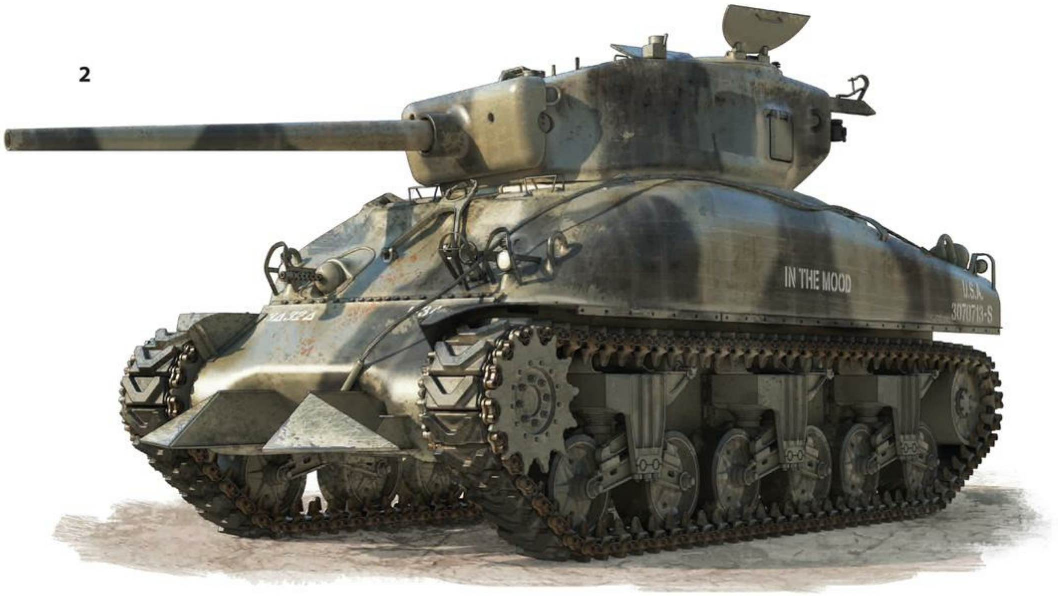


1. M4 medium tank, HQ Company, 37th Tank Battalion, 4th Armoured Division, Avranches, August 1944

One of the best-known American tankers of World War II was Creighton Abrams, commander of the 37th Tank Battalion, who is the namesake of today’s M1 Abrams tank. His initial tank in Normandy was named “Thunderbolt V.” The previous four “Thunderbolts” were tanks used in training in the United States. The 37th Tank Battalion had cartoons painted on the sides of their tanks when first arriving in France, in this case, a cartoon image of clouds and red thunderbolts. Besides this marking, Abrams' tank also had the Armored Force triangle painted on the side further back. The bumper codes on this vehicle were 4^37^ HQ-1, but they are covered by stowage on the hull front. Abrams' tank was fitted with a T2 Richardson hedge-cutter prior to Operation *Cobra*, a feature not well liked in the battalion. Another feature on Abrams' tank was the attachment of a large telephone wire reel on the right side of the turret toward the rear.

2. M4A1 (76mm), I Company, 32nd Armored Regiment, 3rd Armored Division, August 1944

Probably the highest-scoring US tank crew in Normandy was the Sherman commanded by Sgt Lafayette Poole. Poole lost a Sherman to a Panzerfaust in late June and received this new M4A1 (76mm) in mid-July. In July 1944, a captured German tank crewman was interviewed and mocked the sloppy camouflage practices of US tank units. As a result, FUSA ordered all tanks to be painted prior to Operation *Cobra* with a camouflage pattern of black over the existing olive drab. At the same time, many units took the opportunity to paint over large conspicuous markings such as the white star, except for the one on the roof used for air identification. Poole's tank also had the usual tactical number/letter (I-34) painted over in this process. This tank's bumper codes were 3^32^ I-34. This tank was subsequently knocked out in September 1944 during the Stolberg corridor fighting, where Poole was severely wounded.

Churchill III/IV/VI 6-pdr	92	9	83
Churchill 95mm	9	1	8
Churchill VII	19	0	19
Churchill AVRE	32	0	32
M10 17-pdr	16	0	16
Total	**1,176**	**123**	**1,053**

**Appendix G, 21 Army Group RAC Liaison Letter No. 2*

The pace of US tank losses was different than in the British case. Losses during the bocage fighting in the first three weeks of July were relatively low, simply because of the nature of fighting that depended more heavily on infantry. Losses in August climbed much higher, owing to the much larger number of tanks committed to the fighting as well as the usual hazards of offensive tank operations.

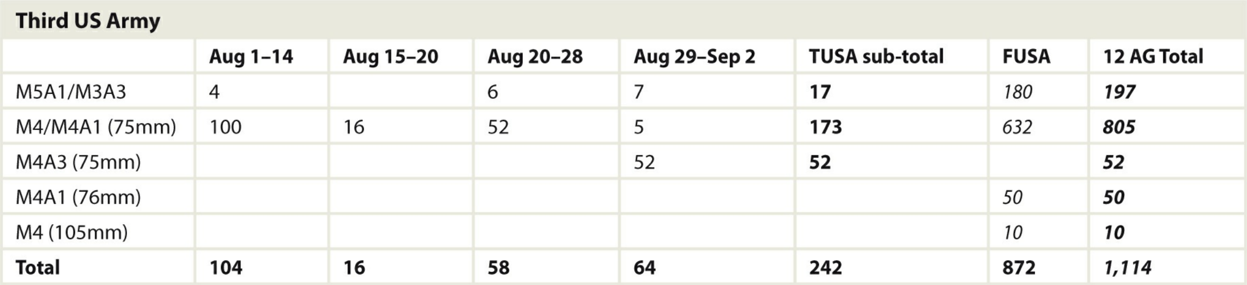
ETOUSA AFV Losses

	Losses to date			**Cumulative losses**
	June 20	**July 20**	**August 20**	**Jun 6--Aug 20, 44**
M5A1 light tank	52	26	201	279
M8 75mm HMC	4	6	18	28
M4 medium tank	187	121	557	865
M4 (105mm) AG	4	3	2	9
M10 3in GMC	1	17	28	46
M18 76mm GMC	0	0	6	6
Total	**248**	**173**	**812**	**1,233**

12th Army Group Tank Losses, D-Day to September 2, 1944

First US Army

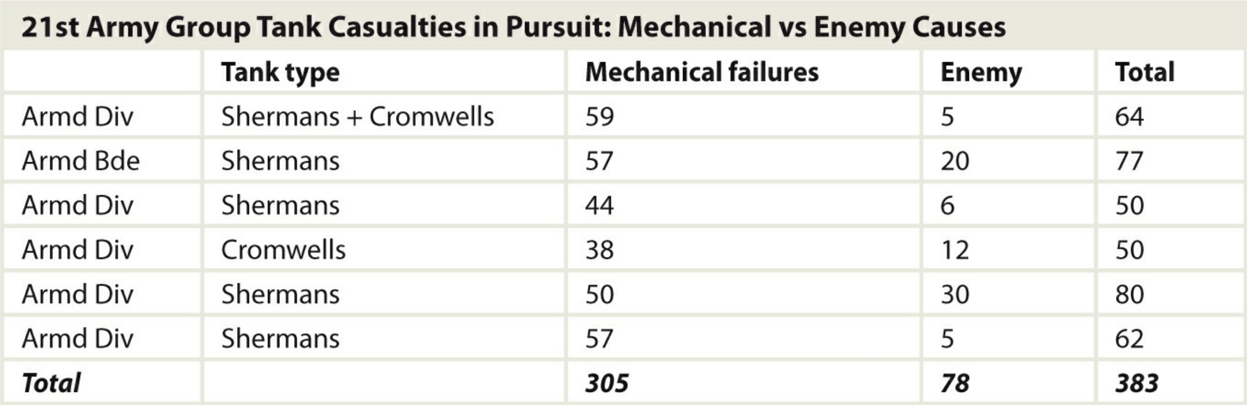
	Jun 6–16	**Jun 17–24**	**Jun 24–Jul 1**	**Jul 2–8**	**Jul 9–15**	**Jul 16–22**	**Jul 22–29**	**Jul 30–Aug 5**	**Aug 6–12**	**Aug 13–19**	**Aug 20–26**	**Aug 27–Sep 2**	**Total**
M5A1	28	8	8	2	18	9	38	33	10	3	9	14	180
M4/M4A1 (75mm)	129	37	21	21	75	33	79	68	76	39	19	35	632
M4A1 (76mm)							12	6	5	11	7	9	50
M4 (105mm)				3			1		1			5	10
Total	**157**	**45**	**29**	**26**	**93**	**42**	**130**	**107**	**92**	**53**	**35**	**63**	**872**



Third US Army

	Aug 1–14	Aug 15–20	Aug 20–28	Aug 29–Sep 2	TUSA sub-total	FUSA	12 AG Total
M5A1/M3A3	4		6	7	**17**	*180*	***197***
M4/M4A1 (75mm)	100	16	52	5	**173**	*632*	***805***
M4A3 (75mm)				52	**52**		***52***
M4A1 (76mm)						*50*	***50***
M4 (105mm)						*10*	***10***
Total	**104**	**16**	**58**	**64**	**242**	**872**	***1,114***

The fighting in late August presented a much different picture in regards to tank casualties. During the pursuit phase, far more tanks were lost to mechanical breakdown than enemy action. This abstract from a 21st Army Group operational research report summarizes the experiences of six unidentified armored divisions and brigades from August 28 to September 7, 1944. These units traveled an average distance of 317 miles and suffered about 16 mechanical breakdowns per 100 miles.



21st Army Group Tank Casualties in Pursuit: Mechanical vs Enemy Causes

	Tank type	Mechanical failures	Enemy	Total
Armd Div	Shermans + Cromwells	59	5	64
Armd Bde	Shermans	57	20	77
Armd Div	Shermans	44	6	50
Armd Div	Cromwells	38	12	50
Armd Div	Shermans	50	30	80
Armd Div	Shermans	57	5	62
Total		***305***	***78***	***383***

Notes

2 “A Survey of Tank Warfare in Europe from D-Day to 12 August 1944,” Army Operational Research Group Memo No C.6, May 1952.

3 Milner, Marc, *Stopping the Panzers*, Univ Press of Kansas (2014).

4 Zaloga, Steven, St Lô *1944: The Battle of the Hedgerows*, Osprey Campaign 308 (2017).

5 Zaloga, Steven, *Mortain 1944: Hitler’s Normandy Panzer Offensive*, Osprey Campaign 335 (2019).

FURTHER READING

The Normandy campaign is amply covered in books. The British use of tanks in Normandy is somewhat better documented, in large measure due to the controversies over British armored operations such as *Totalize*. While there are excellent surveys of British armor in Normandy, the same is not the case for the US Army. However, US tank operations in Normandy are covered in many scattered division and battalion histories. This short list covers only the major surveys but omits the hundreds of battle and unit histories. The author also consulted numerous official US Army and British Army reports and histories.

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ABOUT THE AUTHOR

Steven J. Zaloga received his BA in History from Union College and his MA from Columbia University. He has worked as an analyst in the aerospace industry for over two decades, covering missile systems and the international arms trade, and has served with the Institute for Defense Analyses, a federal think tank. He is the author of numerous books on military technology and military history, with an accent on the US Army in World War II as well as Russia and the former Soviet Union.

ILLUSTRATOR

Felipe Rodríguez Náñez (aka Felipe Rodna) was born in 1976, and lives with his wife and two sons in Salamanca, Spain, where he works as an architect and computer graphics artist. He combines his experience in CG art and his passion for modelling in his illustrations, where he looks for a good balance between technical detail and craft.

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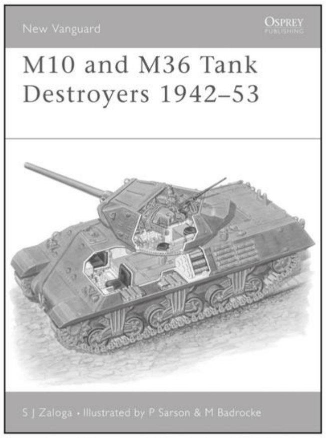
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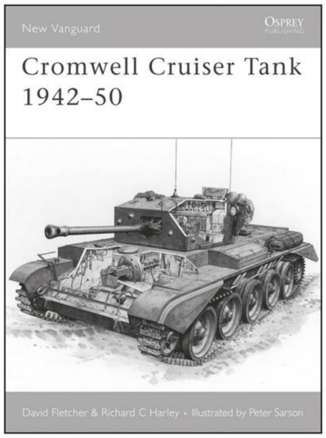
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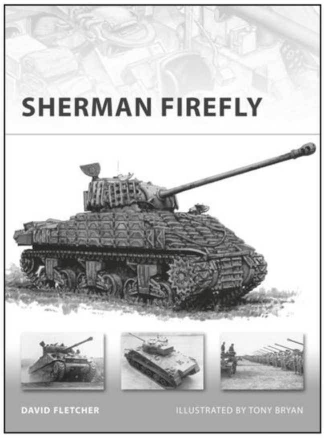
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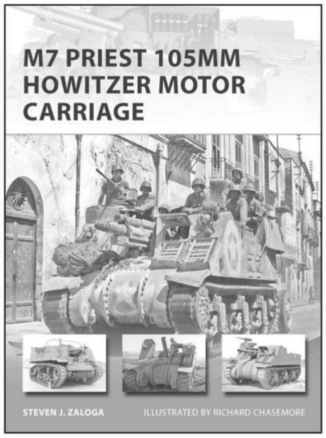
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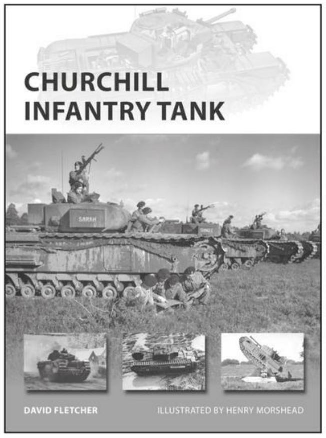
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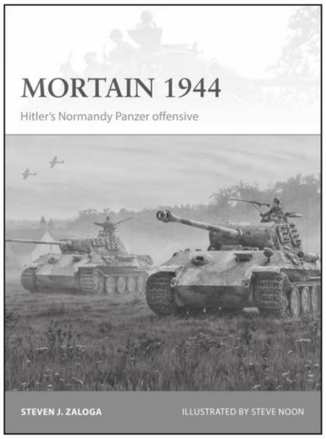
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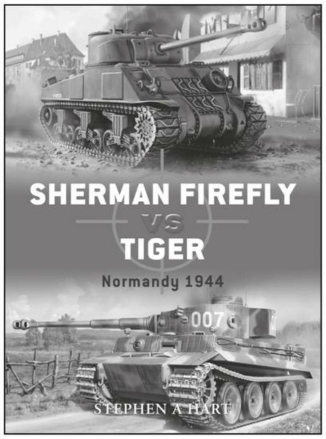
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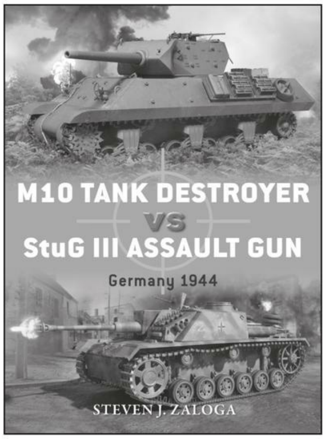
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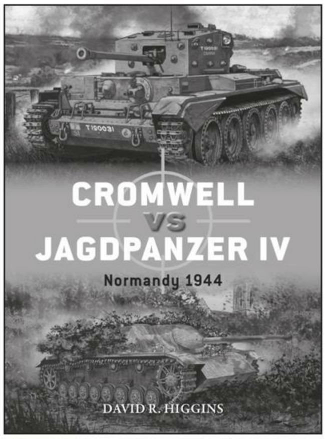
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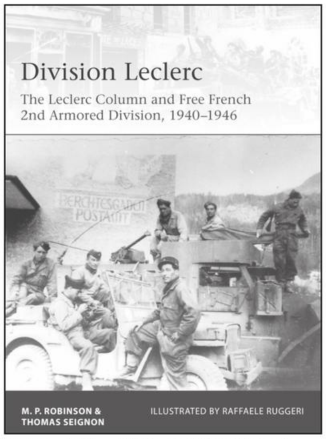
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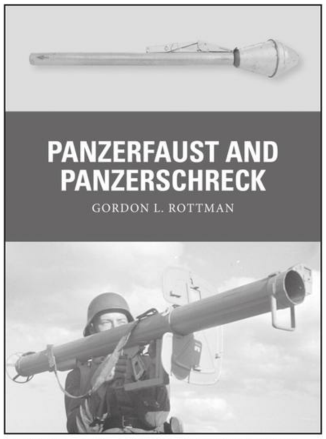
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Author's Note

The author would especially like to thank Peter Brown for his generous help regarding British tanks in Normandy. Unless otherwise noted, the photos here are from official US government archives.

Glossary

AFV	Armored Fighting Vehicle
AoS	Arm of Service
APCBC	Armor-Piercing, Capped with Ballistic Cap
APDS	Armor-Piercing Discarding Sabot
Bde	Brigade
ETO	European Theater of Operations
FUSA	First US Army
HVAP	high-velocity, armor-piercing (projectile)
LAC	Library and Archives Canada
OP	Observation Post (tank)
RAC	Royal Armoured Corps
SP	Self-propelled (gun)
TO&E	Table of Organization and Equipment (US Army)
TUSA	Third US Army